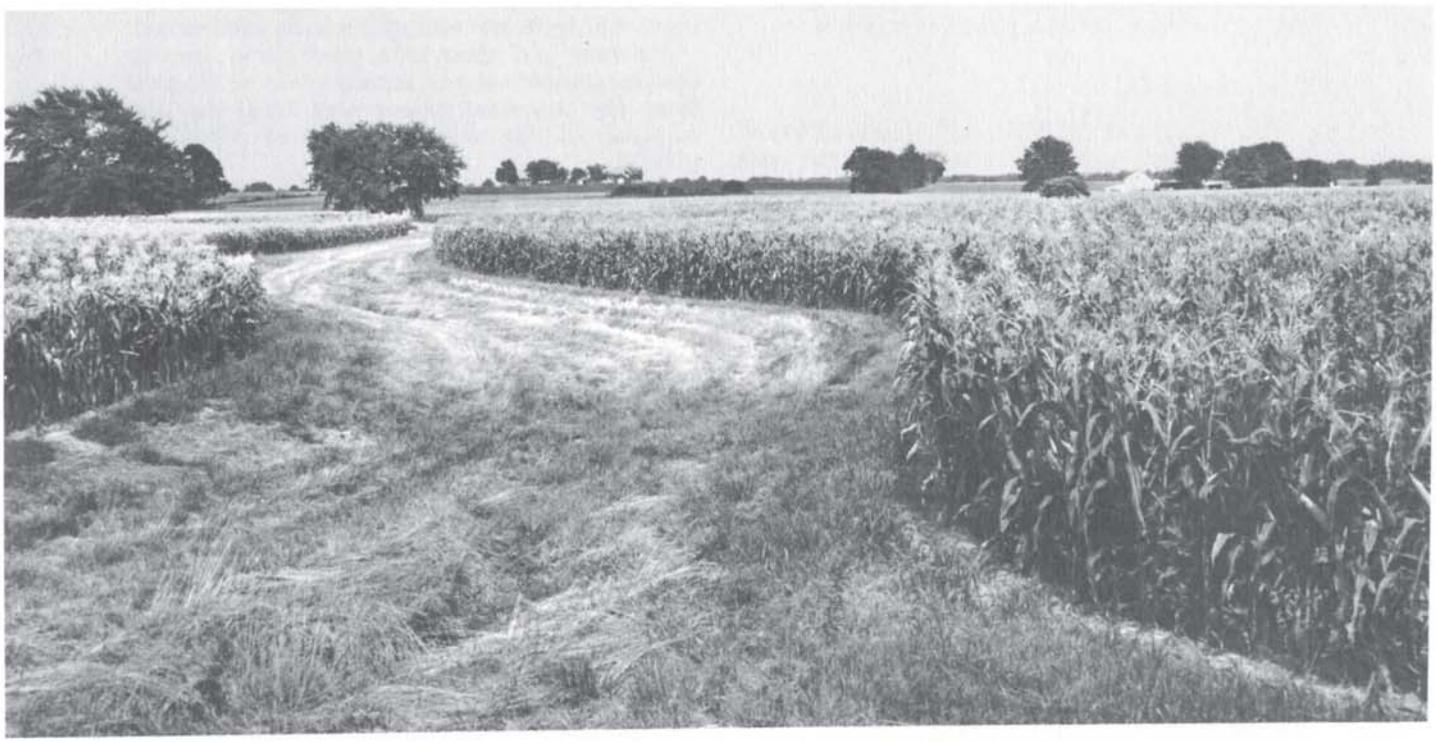
SOIL SURVEY OF

Edwards and Richland Counties Illinois



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Illinois Agricultural Experiment Station

Issued September 1972

Major fieldwork for this soil survey was done in the period 1956 to 1965. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in this publication refer to conditions in the counties in 1965. The survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Edwards County and the Richland County Soil and Water Conservation Districts.

Enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased from the Cartographic Division, Soil Conservation Service, USDA, Washington, D.C. 20250. This soil survey is Illinois Agricultural Experiment Station Soil Report No. 90.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for agriculture, industry, and recreation.

Locating Soils

All the soils of Edwards and Richland Counties are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in numerical order by map symbol and gives the management classification of each. It also shows the page where each soil is described and the page for the woodland group and any other group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the management and woodland groups.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Recreation specialists will find pertinent information in the section "Recreational Uses of the Soils."

Local planning boards will find valuable information about the location, extent, and limitations of soils for various rural and urban uses.

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of Soils."

Newcomers in Edwards and Richland Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given at the beginning of the publication.

Cover: Typical landscape in Edwards and Richland Counties. Gently sloping Hoyleton and Bluford soils in foreground; Ava and Richview soils in background.

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Contents

	Page
General nature of the area	1
Physiography, relief, and drainage	1
Climate	2
Settlement, industry, and farming	4
How this survey was made	4
General soil map	5
1. Cisne-Hoyleton association	5
2. Bluford-Ava-Blair association	5
3. Hosmer-Stoy-Alford association	7
4. Grantsburg-Zanesville association	7
5. Racoon-Chauncey association	8
6. Patton-Montgomery-Reesville association	8
7. Belknap-Bonnie-Petrolia association	8
Descriptions of the soils	9
Alford series	11
Allison series	11
Alvin series	12
Ava series	12
Belknap series	14
Blair series	14
Bluford series	15
Bonnie series	17
Camden series	17
Chauncey series	18
Cisne series	18
Coffeen series	19
Darwin series	19
Ebbert series	20
Grantsburg series	21
Hickory series	21
Hosmer series	22
Hoyleton series	24
Huey series	25
Lukin series	26
Marissa series	26
McGary series	27
Montgomery series	28
Newberry series	28

Descriptions of the soils—Continued	Page
Patton series	29
Petrolia series	30
Racoon series	30
Reesville series	31
Richview series	31
Robbs series	32
Sexton series	33
Shale rock land	33
Sharon series	34
Stoy series	34
Tamalco series	35
Wakeland series	36
Wellston series	36
Wynoose series	37
Zanesville series	38
Use and management of the soils	38
Capability grouping	38
Management groups	39
Estimated yields	45
Woodland	47
Wildlife	50
Recreational uses of the soils	51
Engineering uses of the soils	54
Engineering classification systems	54
Engineering test data	55
Estimated engineering properties	55
Engineering interpretations	78
Formation and classification of soils	79
Factors of soil formation	79
Parent material	79
Climate	80
Plants and animals	80
Relief and drainage	81
Time	81
Classification of soils	81
Laboratory data references	82
Literature cited	82
Glossary	82
Guide to mapping units Following	84

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SOIL SURVEY OF EDWARDS AND RICHLAND COUNTIES, ILLINOIS

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH ILLINOIS AGRICULTURAL EXPERIMENT STATION

EDWARDS AND RICHLAND COUNTIES are in the southeastern part of Illinois (fig. 1). Edwards County is south of Richland County and is bounded on the southeast corner by the Wabash River. Olney is the county seat of Richland County; Albion, the county seat of Edwards County, is 25 miles south of Olney.

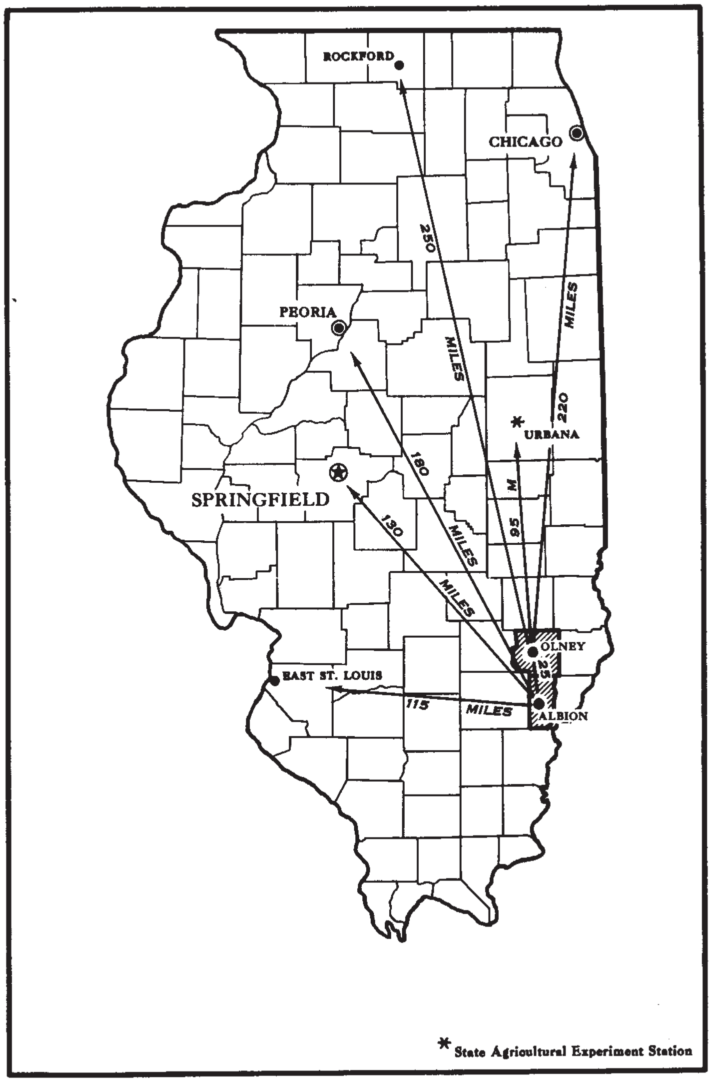

Figure 1.—Location of Edwards and Richland Counties in Illinois.

General Nature of the Area

This section gives general information about Edwards and Richland Counties. The relief and climate of the two counties are described, and some general facts are given about their settlement and their industrial and farm development.

Physiography, Relief, and Drainage

Edwards and Richland Counties have relatively low relief. Elevation ranges from about 370 feet above sea level on the bottom land of the Wabash River near Grayville, in the southeastern part of Edwards County, to about 580 feet on the higher knobs in the north-central and northeastern parts of Richland County and the south-central and southwestern parts of Edwards County.

Most soils in the two counties are on uplands. The uplands consist mainly of a glacial till plain that is covered by loess. The thickness of the loess varies. In the southern part of Edwards County, however, are several areas where little or no glacial till is above the bedrock. Areas of alluvial land and bottom land are widespread, and occur along the Wabash, Little Wabash, and Embarras Rivers and along Bonpas Creek.

All of the rivers and creeks in the survey area drain into the Wabash River. The western part of both counties is drained by the Little Wabash River. The northeastern part of Richland County is drained by the Embarras River, and the central part is drained by the Fox River. The southeastern part of Richland County and the eastern part of Edwards County are drained mainly by Bonpas Creek.

Sources of water in the two counties are limited. On bottom lands, the alluvium yields a substantial amount of water. On uplands, shallow wells and cisterns are com-

monly used, and some wells have been drilled into bedrock. In many areas, water stored in ponds and lakes is used by livestock and to supply community needs.

Climate [1]

Edwards and Richland Counties have the continental climate typical of southern Illinois. There is a wide annual temperature range, averaging about 105° F. from near 100° in summer to slightly below zero in winter. Storm centers and associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year. Such changes are less frequent in summer.

As shown in table 1, summers are warm and include prolonged periods of exceptional warmth. Temperatures above 100° occur during about half of the summers. Temperatures of 90° or higher occur on about half the days of an average July or August and on about 60 days in an average year.

January is normally the coldest month. February often has days as cold as January, but February cold spells are usually of shorter duration. The record low temperature of −25° occurred in February. About two-thirds of the winters have temperatures below zero. An average of 90 to 100 days annually have temperatures of 32° or lower.

The number of days between the average date of the last freezing temperature (32° or below) in spring and the first freeze in fall has been termed the "growing season." This is approximately 184 days along the Edwards-Richland County line. The "growing season" designation is misleading, because different crops have different temperatures at which growth is affected. Table 2 indicates the probability of occurrence of several different threshold temperatures (*11*).[2] Temperatures are often considerably lower in valleys than on ridges, because of cold air draining into the valleys.

All freeze data are based on temperatures in a standard U.S. Weather Bureau thermometer shelter at a height of approximately 5 feet above the ground and in a representative exposure. Lower temperatures will exist at times nearer the ground and in local areas subject to extreme air drainage. Data shown are for the Edwards-Richland County line and will ordinarily be a few days later in spring and earlier in fall for northern Richland County and be a few days earlier in spring and later in fall for southern Edwards County.

Annual precipitation ordinarily is 41 to 43 inches but has ranged from a low of near 25 inches to a high near 70 inches. Monthly precipitation averages nearly 4 inches from March through July. The average is only about 2½ inches for the normally driest months of October and February. During recent years there has been an annual average of about 70 days with one-tenth inch or more precipitation, and about 30 days with one-half inch or more. Table 3 shows the probability of selected amounts of precipitation during selected 1- or 2-week periods (*3*).

Because normal July and August rainfall is not sufficient to meet the demands of a vigorously growing field crop, moisture must be stored in the subsoil during the previous fall and winter. Severe droughts are infrequent, but prolonged dry periods during a part of the growing season are not unusual. Such periods usually cause reduced crop yields.

Most summer showers or thunderstorms are brief. A single thunderstorm often produces more than an inch of rain, and occasionally it is accompanied by hail and damaging winds. More than 4½ inches of rain has fallen

[1] Prepared by WILLIAM L. DENMARK, climatologist for Illinois, Environmental Science Services Administration, U.S. Weather Bureau, Champaign, Illinois.

[2] Italicized numbers in parentheses refer to Literature Cited, p. 82.

TABLE 1.—*Temperature and precipitation data*

Month	Temperature					Precipitation			
	Average daily maximum	Average daily minimum	Average daily mean	Record highest	Record lowest	Average total	One year in 10 will have: More than—	One year in 10 will have: Less than—	Mean monthly snowfall
	°F.	°F.	°F.	°F.	°F.	In.	In.	In.	In.
January	41	24	33	75	−21	3.4	10.4	1.4	2.3
February	44	25	35	76	−25	2.4	3.9	.9	3.0
March	55	34	44	89	−6	4.0	6.4	1.9	3.7
April	66	44	55	91	21	4.0	6.8	2.0	(1)
May	77	53	65	98	30	4.6	8.6	1.9	0
June	86	62	74	106	36	3.8	6.5	1.0	0
July	90	66	78	112	45	3.8	7.9	1.0	0
August	89	64	77	109	41	3.3	6.3	1.2	0
September	83	57	70	106	27	3.1	6.2	.8	0
October	71	46	59	97	17	2.7	4.1	.8	(1)
November	55	35	45	83	−2	3.7	5.6	1.2	.7
December	43	26	35	72	−15	3.0	4.4	1.4	3.9
Year	67	45	56	112	−25	41.8	51.8	32.9	13.6

[1] Trace.

TABLE 2.—*Freeze probabilities in Edwards and Richland Counties*

Probability	32° F.	28° F.	24° F.	20° F.	16° F.
Last in spring:					
Average date	April 17	March 31	March 19	March 8	March 1
25 percent chance after	April 26	April 9	March 28	March 17	March 10
10 percent chance after	May 4	April 17	April 5	March 25	March 18
First in fall:					
Average date	October 19	November 3	November 12	November 24	December 5
25 percent chance before	October 10	October 25	November 3	November 15	November 26
10 percent chance before	October 3	October 18	October 27	November 8	November 19

within a 24-hour period, and nearly 15 inches during a month. Some fall and winter months have had less than one-fourth inch of precipitation.

Growing field crops are most likely to be damaged by hail in the months of June, July, and August. Hail-producing thunderstorms average less than three per year in the same location, and less than one during the critical growing period (*9*). Not all hailstorms have stones of sufficient size or quantity to produce extensive crop damage.

TABLE 3.—*Chance in percent of selected amounts of precipitation*

[These probabilities show the seasonal pattern of expected rainfall. A probability that contrasts with those of the immediately adjacent periods is likely to be unreliable for planning a specific operation]

Week of—	During a 1-week period				During a 2-week period		
	Chance of trace or less	Chance of 0.4 inch or more	Chance of 1 inch or more	Chance of 2 inches or more	Chance of trace or less	Chance of 1 inch or more	Chance of 2 inches or more
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
March 1–7	13	55	24	6	2	66	31
March 8–14	2	63	35	14			
March 15–21	7	61	30	9	0	65	34
March 22–28	6	67	37	14			
March 29–April 4	9	63	33	16	0	71	37
April 5–11	4	72	39	13			
April 12–18	8	61	32	11	0	61	29
April 19–25	11	60	26	6			
April 26–May 2	11	62	36	14	0	64	35
May 3–9	8	62	33	11			
May 10–16	11	61	36	16	2	62	38
May 17–23	15	60	36	15			
May 24–30	17	56	31	12	6	64	35
May 31–June 6	15	66	38	13			
June 7–13	13	62	37	15	4	61	33
June 14–20	20	52	27	9			
June 21–27	9	67	39	15	0	63	33
June 28–July 4	15	53	25	7			
July 5–11	13	55	30	12	6	58	30
July 12–18	15	54	28	9			
July 19–25	28	45	22	6	6	43	19
July 26–August 1	13	44	19	5			
August 2–8	15	51	29	12	2	60	33
August 9–15	11	62	34	12			
August 16–22	11	60	36	15	6	56	32
August 23–29	24	47	26	10			
August 30–September 5	20	54	32	14	2	57	29
September 6–12	17	53	26	8			
September 13–19	30	51	30	12	6	55	27
September 20–26	22	52	26	8			
September 27–October 3	28	46	27	12	6	49	26
October 4–10	17	46	24	9			
October 11–17	28	46	24	8	11	48	26
October 18–24	33	48	28	12			
October 25–31	31	45	25	10	11	54	28
November 1–7	22	54	31	11			
November 8–14	17	50	18	6	4	50	24
November 15–21	22	51	29	12			

Settlement, Industry, and Farming

Edwards County was established in 1814, and its present boundaries were set in 1825. It has an area of 225 square miles, or about 144,000 acres. In 1960 the population of the county was 7,940, and the population of Albion, the county seat, was 2,025.

Richland County was established in 1841. It has an area of nearly 364 square miles, or 232,832 acres. In 1960 the population of the county was 16,299, and the population of Olney, the county seat, was 8,780.

Transportation is well developed in the survey area. State Highway 130 crosses both counties in a north-south direction. U.S. Highway 50 and State Highway 15 cross the counties from east to west. Main secondary roads are blacktop or gravel, and all parts of both counties are accessible by gravel roads. Railroad lines serve both counties.

A number of industrial plants are located in Olney, Albion, and West Salem. Many townships throughout both counties have producing oil wells.

The main enterprise in Edwards and Richland Counties is farming. In 1964 Edwards County had 697 farms, and an average size farm was 197 acres; Richland County had 998 farms, and an average size farm was 200 acres. Most grain is sold to local elevators at Albion and Olney. Livestock, however, is marketed at Evansville, Ind. and East St. Louis, Ill.

Corn, soybeans, and wheat are the main crops. In 1964, soybean acreage was 18,795 in Edwards County and 52,798 in Richland County; corn acreage was 32,867 in Edwards County and 38,496 in Richland County. Wheat acreage was 13,763 in Edwards County and 20,674 in Richland County. In 1964, about 25,593 acres in Edwards County and 29,104 acres in Richland County were in pasture.

In 1964, swine numbered 45,643 in Edwards County and 27,236 in Richland County; beef cattle numbered 13,970 in Edwards County and 15,186 in Richland County. Sheep numbered 1,699 in Edwards County and 2,337 in Richland County. Dairy cattle numbered 865 in Edwards County and 1,616 in Richland County; and chickens numbered 105,808 in Edwards County and 84,564 in Richland County.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Edwards and Richland Counties, where they are located, and how they can be used. The soil scientists went into the area knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in a local survey (*18*).

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Wynoose and Cisne, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Hickory loam, 12 to 18 percent slopes, eroded, is one of several phases within the Hickory series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Hickory soils, 12 to 30 percent slopes, severely eroded, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Shale rock land is a land type in Edwards and Richland Counties.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to

be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland and rangeland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Edwards and Richland Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in Edwards and Richland Counties are discussed in the following pages.

1. Cisne-Hoyleton Association

Nearly level to moderately sloping, poorly drained and somewhat poorly drained soils that formed in loess and glacial till; on uplands

This association consists of nearly level to moderately sloping soils on uplands. Except for a few moundlike areas, these soils generally appear flat (fig. 2). One of the most prominent of these moundlike areas is at Onion Hill. Large areas of this association are around Calhoun, Noble, and Onion Hill in Richland County, and small areas are in the northern part of Edwards County.

This association makes up about 27 percent of the two counties. About 48 percent of this is Cisne soils, 42 percent is Hoyleton soils, and the remaining 10 percent is minor soils.

The Cisne soils have slopes of 0 to 2 percent and are poorly drained. Their surface layer is silt loam about 9 inches thick, and their subsurface layer is also silt loam about 9 inches thick. The silty clay loam subsoil, about 34 inches thick, is commonly called a claypan. It is underlain by grayish-brown silty clay loam mottled with yellowish brown.

The Hoyleton soils have slopes of 0 to 7 percent and are somewhat poorly drained. They are in moundlike areas and on slopes at the upper ends of drainageways. The surface layer is silt loam about 9 inches thick, and the subsurface layer is silt loam about 5 inches thick. The subsoil is silty clay loam about 41 inches thick. It is underlain by light brownish-gray silty clay loam that is mottled with gray and yellowish brown.

Figure 2.—**Typical landscape in association 1. Cisne soils in foreground and Hoyleton soils on moundlike areas in background.**

Among minor soils in this association are poorly drained Ebbert and Newberry soils in depressions, moderately well drained Richview soils in moundlike areas, Chauncey and Lukin soils at the base of slopes, and Huey and Tamalco soils in small slick spots. Huey and Tamalco soils contain a large amount of sodium.

This association is used mostly for crops. It is suited to all crops commonly grown in the two counties. Drainage is needed in most places. The erosion hazard is moderate to severe where the soils are sloping. Maintaining drainage systems, soil tilth, and soil fertility are the main concerns in managing cultivated areas.

2. Bluford-Ava-Blair Association

Nearly level to strongly sloping, somewhat poorly drained and moderately well drained soils that formed in loess and glacial till; on uplands

This association consists of nearly level and gently sloping soils in broad areas in the uplands and moderately sloping to strongly sloping soils on side slopes along drainageways (fig. 3, top).

This association makes up about 41 percent of the two counties. About 42 percent of this is Bluford soils, 19 percent is Ava soils, 17 percent is Blair soils, and the remaining 22 percent is minor soils.

The Bluford soils have slopes of 0 to 7 percent and are somewhat poorly drained. The surface layer is silt loam about 6 inches thick, and the subsurface layer is silt loam about 7 inches thick. The subsoil is silty clay loam about 27 inches thick. Below the subsoil is yellowish-brown heavy silt loam to light silty clay loam mottled with gray.

The Ava soils have slopes of 2 to 12 percent and are moderately well drained. The surface layer is silt loam about 6 inches thick, and the subsurface layer is silt loam about 4 inches thick. The subsoil is silty clay loam that extends to a depth of about 44 inches. It has a dense, compact layer called a fragipan below a depth of 34 inches. Below this is brown gritty silty clay loam.

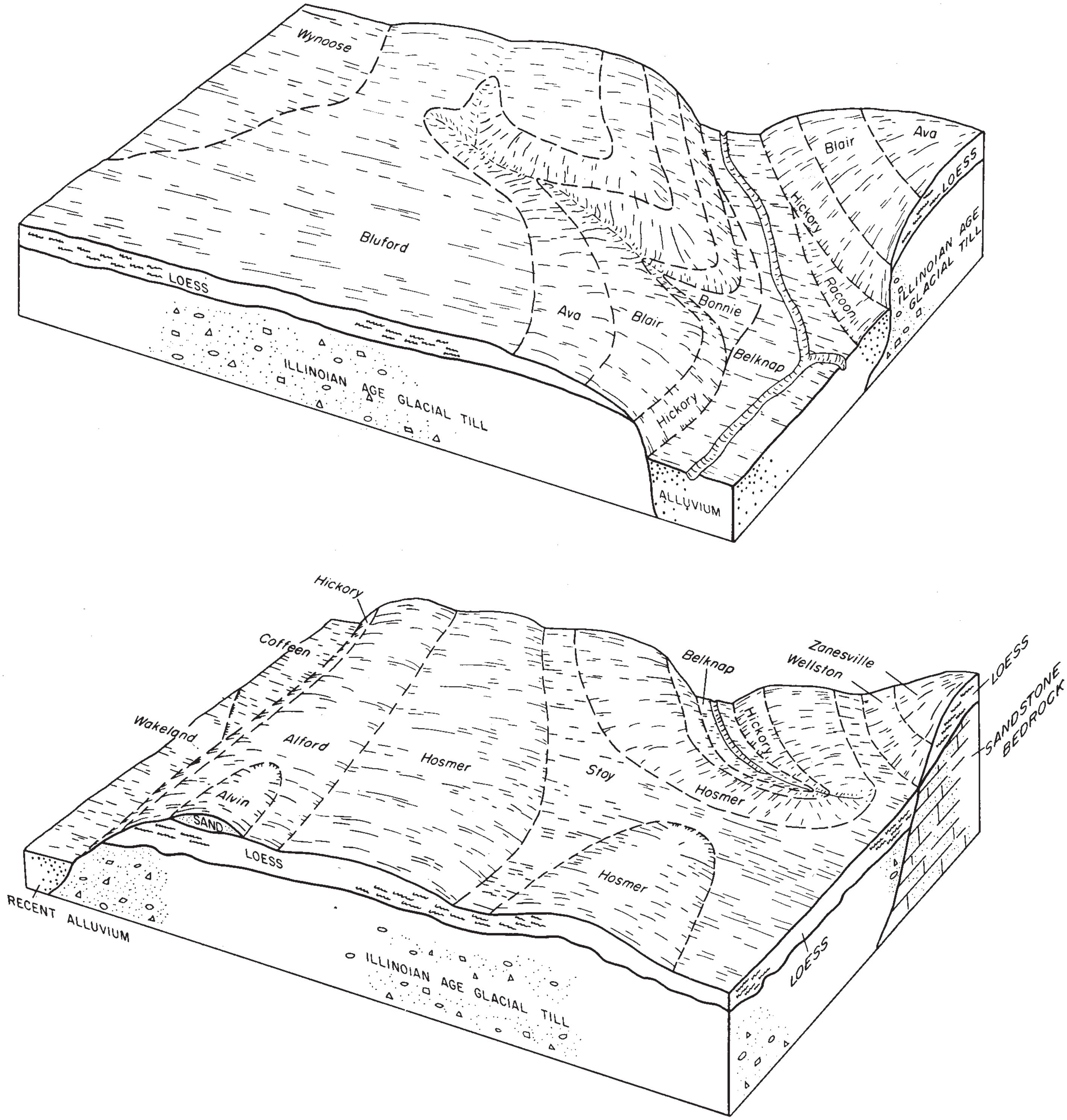

***Figure 3.*—Relationship of soils to topography and underlying material: *top,* Bluford-Ava-Blair association; *bottom,* Hosmer-Stoy-Alford Association.**

The Blair soils have slopes of 4 to 12 percent and are somewhat poorly drained. The surface layer is silt loam about 5 inches thick. The subsoil, about 60 inches thick, is gritty silty clay loam in the upper part and clay loam in the lower part. Below the subsoil is mixed gray, brown, and yellowish-brown clay loam.

Among the minor soils in this association are the Wynoose and Hickory soils on uplands, Racoon soils at the base of steep slopes, and Belknap, Bonnie, and Sharon soils on bottom lands.

Nearly two-thirds of this association is used for crops, and the rest is used about equally for permanent pasture and woodland. The soils are suited to all crops commonly grown in the counties. Maintaining drainage systems, controlling erosion, and maintaining fertility and tilth are the main concerns in managing cultivated areas. Drainage is needed where the soils are nearly level and in some places where they are gently sloping. Flooding is a hazard on the bottom lands where minor soils occur.

3. Hosmer-Stoy-Alford Association

Nearly level to steep, somewhat poorly drained to well-drained soils that formed in loess; on uplands

This association consists of nearly level to moderately sloping soils on ridgetops and strongly sloping to steep soils on side slopes. Small narrow areas of bottom land extend into the uplands (fig. 3, bottom).

This association makes up about 5 percent of the survey area. About 42 percent is Hosmer soils, 17 percent is Stoy soils, 11 percent is Alford soils, and the remaining 30 percent is minor soils.

The Hosmer soils are on ridgetops and side slopes. They have slopes of 2 to 18 percent and are moderately well drained. The surface layer is silt loam about 6 inches thick, and the subsurface layer is silt loam about 4 inches thick. The subsoil, about 47 inches thick, is silty clay loam in the upper part and has a dense silt loam fragipan in the lower part. Below the fragipan is yellowish-brown silt loam that is mottled with light gray.

The Stoy soils are on ridgetops. They have slopes of 0 to 7 percent and are somewhat poorly drained. The surface layer is silt loam about 7 inches thick, and the subsurface layer is silt loam about 10 inches thick. The subsoil, about 28 inches thick, is silty clay loam that is somewhat dense and compact in the lower part. Below the subsoil is yellowish-brown silt loam mottled with grayish brown.

The Alford soils occur along State Route 1 north of Grayville. They have slopes of 2 to 30 percent and are well drained. The surface layer is silt loam about 6 inches thick, and the subsurface layer is silt loam about 5 inches thick. The subsoil is silty clay loam about 54 inches thick. Below the subsoil is yellowish-brown silt loam.

Minor soils include the Alvin, Hickory, Zanesville, and Wellston soils on uplands and the Belknap, Bonnie, Coffeen, and Wakeland soils on bottom lands.

The soils on most of the ridgetops in this association are used for crops. These soils are suited to all crops commonly grown in the counties. Several areas are in apple and peach orchards. Where the soils are more sloping, they are in pasture or woodland, or they are idle. Controlling erosion and maintaining fertility are the main concerns in cultivated areas. Flooding is a hazard on bottom lands. The soils on bottom lands also need drainage.

4. Grantsburg-Zanesville Association

Gently sloping to moderately steep, moderately well drained to well drained soils that formed in loess and material weathered from sandstone; on uplands

All of this hilly association is in the southwestern part of Edwards County. It consists of gently sloping and moderately sloping soils on ridgetops and high rounded hills and strongly sloping and moderately steep soils on side slopes (fig. 4). Some minor soils are steep, and some are on narrow bottom lands.

This association makes up about 4 percent of the two counties. About 42 percent of this is Grantsburg soils, 31 percent is Zanesville soils, and the remaining 27 percent is minor soils.

The Grantsburg soils are mainly on ridgetops. They have slopes of 2 to 7 percent and are moderately well drained. The surface layer is silt loam about 7 inches thick, and the subsurface layer is silt loam about 4 inches thick. The subsoil, which extends to a depth of about 50 inches, is heavy silt loam to light silty clay loam and has a fragipan in the lower 25 inches. Below the fragipan is yellowish-brown silt loam mottled with gray.

The Zanesville soils are on side slopes. They have slopes of 7 to 18 percent and are moderately well drained to well drained. In areas not cultivated, the surface layer is silt loam about 3 inches thick and the subsurface layer is silt loam about 5 inches thick. These layers are mixed in cultivated areas. The subsoil extends to a depth of about 45 inches. It is silt loam in the upper 4 inches, silty clay loam in the next 18 inches, and light silty clay loam below. The lower 15 inches of the subsoil is a fragipan. Below this are sandstone cobbles, loose material, and hard bedrock.

Minor soils in this association are the Robbs, Bluford, Ava, Hoyleton, and Lukin soils on uplands and the Belknap, Bonnie, and Coffeen soils on bottom lands.

This association is used mainly for pasture. Some row crops and several small apple and peach orchards are on the ridgetops. Here the soils are suited to all crops commonly grown. In some places, particularly in severely

Figure 4.—**High rounded hills in association 4 dominated by Grantsburg and Zanesville soils. Lower slopes and ridges are commonly glaciated and consist of loess and till.**

eroded areas, the soils are idle or have a bushy growth. In most places the steeper soils are wooded. Controlling erosion and maintaining fertility are the main management concerns. Flooding and wetness are hazards on bottom lands.

5. Racoon-Chauncey Association

Nearly level, poorly drained soils that formed in loess and the underlying silt loam sediments; on terraces

This association consists of nearly level soils on terraces. Most areas are less than 1 mile wide and are bounded by uplands on one side and by bottom lands or terraces on the other. In some places, the terraces are only slightly higher than the bottom lands.

This association makes up about 2 percent of the two counties. About 51 percent of this is Racoon soils, 42 percent is Chauncey soils, and the remaining 7 percent is minor soils.

The Racoon soils are poorly drained. They occur mainly on terraces, but some areas are on uplands. The surface layer is silt loam about 7 inches thick, and the subsurface layer is silt loam about 19 inches thick. The subsoil is silty clay loam about 17 inches thick. Below the subsoil is gray silt loam mottled with red and brown.

The Chauncey soils are poorly drained. They are mainly on terraces, but some areas are on uplands. They have a darker surface layer than the Racoon soils. This layer is silt loam and about 12 inches thick. The subsurface layer is silt loam that extends to a depth of about 28 inches. The subsoil, about 22 inches thick, is silty clay loam. Below the subsoil is light brownish-gray silt loam mottled with yellowish brown.

Also in this association are the Lukin, Belknap, Bonnie, and Coffeen soils. Lukin soils occupy the largest acreage. They are somewhat poorly drained and are on terraces. The Belknap, Bonnie, and Coffeen soils are on bottom lands.

Nearly all of this association is used for corn, soybeans, and wheat. Some small wet areas are in woodland or permanent pasture. Surface drainage is needed in most areas. Except where they have been adequately limed and fertilized, all of these soils are strongly acid and low in fertility. Some areas are subject to flooding.

6. Patton-Montgomery-Reesville Association

Nearly level to moderately sloping, poorly drained and somewhat poorly drained soils that formed in silt loam and silty clay sediments; on terraces

This association consists mainly of nearly level soils on broad terraces along Bonpas Creek and the Little Wabash River (fig. 5). Where the terraces border bottom lands, the soils are gently sloping and moderately sloping and slopes are short. All of this association is in Edwards County.

This association makes up about 4 percent of the two counties. About 31 percent of this is Patton soils, 20 percent is Montgomery soils, 15 percent Reesville soils, and the remaining 34 percent is minor soils.

The Patton soils are nearly level and poorly drained. The surface layer is silty clay loam about 15 inches thick, and the subsoil is silty clay loam about 32 inches thick. Below the subsoil is grayish-brown silty clay loam and silt loam mottled with brown and yellowish brown.

***Figure 5.*—A typical landscape in association 6. Nearly level Montgomery soils on broad terraces.**

The Montgomery soils are also nearly level and poorly drained. The surface layer is silty clay about 15 inches thick, and the subsoil is silty clay about 40 inches thick. Below the subsoil is light olive-brown silty clay mottled with yellowish brown.

The Reesville soils are lighter colored than the Patton and Montgomery soils. They have slopes of 0 to 7 percent and are somewhat poorly drained. The surface layer is silt loam about 5 inches thick, and the subsurface layer is silt loam about 5 inches thick. The subsoil is silty clay loam about 35 inches thick. Below the subsoil is yellowish-brown or olive-brown silt loam mottled with grayish brown.

Minor soils are Alvin, Camden, and Sexton soils on terraces and Belknap, Wakeland, and Petrolia soils on bottom lands.

Most of this association is used for crops. Corn, soybeans, and wheat are the main crops, but these soils are suited to all the crops commonly grown in the two counties. Some small wet areas and sloping areas are in woodland or permanent pasture. Erosion is a hazard on the sloping soils, and flooding is a hazard on bottom lands. Surface drainage is needed on most of the association. Maintaining drainage systems, soil tilth, and fertility are the main concerns in cultivated areas.

7. Belknap-Bonnie-Petrolia Association

Nearly level, somewhat poorly drained and poorly drained soils formed in silt loam and silty clay loam sediments; on bottom lands

This association consists of soils on bottom lands throughout the survey area. About half the acreage is in Edwards County, and half in Richland County. Some areas too narrow to be shown on the general soil map were included with other associations.

This association makes up about 17 percent of the two counties. About 57 percent of this is Belknap soils, 19 percent is Bonnie soils, 4 percent is Petrolia soils, and the remaining 20 percent is minor soils.

The Belknap soils are somewhat poorly drained. The surface layer is silt loam about 15 inches thick. The subsoil is strongly acid silt loam about 25 inches thick. Below the subsoil is very strongly acid grayish-brown silt loam mottled with strong brown.

The Bonnie soils are poorly drained. The surface layer is silt loam about 6 inches thick. The subsoil is very strongly acid silt loam about 15 inches thick. Below the subsoil is very strongly acid gray silt loam mottled with yellowish brown and yellowish red.

The Petrolia soils are poorly drained. The surface layer is silty clay loam about 12 inches thick. The subsoil, also silty clay loam, is about 41 inches thick and slightly acid. Below the subsoil is slightly acid olive-gray and gray silty clay loam mottled with olive brown and yellowish brown.

Minor soils in the association are the Allison, Coffeen, Darwin, Sharon, and Wakeland soils. All of these soils are on bottom lands.

This association is used for crops, permanent pasture, and trees. Corn and soybeans are the main cultivated crops. About half of the small bottom lands are used for crops, and half for pasture. Almost all of the large areas along the Embarras River are used for crops; large areas in the Little Wabash River and Fox River valleys, however, are only about one-third in crops and two-thirds wooded. Most of the crops are on Belknap soils, and most of the trees are on Bonnie and Petrolia soils. Trees also grow on Belknap soils.

Flooding is the main hazard and wetness is the main limitation on soils of this association. Maintaining soil tilth and fertility are concerns in managing cultivated areas.

Descriptions of the Soils

This section describes the soil series and mapping units of Edwards and Richland Counties. The approximate acreage and proportionate extent of each mapping unit are given in table 4.

The procedure is first to describe the soil series, and then the mapping units in that series. Thus, to get full information on any one mapping unit, it is necessary to read the description of that unit and also the description of the soil series to which it belongs. Not all mapping units are members of a soil series. Shale rock land, for example, is a miscellaneous land type that does not belong to a soil series. It is listed, nevertheless, in alphabetic order along with the soil series.

In comparing a mapping unit with a soil series, many will prefer to read the short description in paragraph form. It precedes the technical description that identifies layers by A, B, and C horizons and depth ranges. The technical profile descriptions are mainly for soil scientists and others who want detailed information about soils. Unless otherwise indicated, the colors given in the descriptions are those of a moist soil. Some of the terms used to describe the soils are defined in the Glossary at the back of this survey.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the management group in which the mapping unit has been placed. The "Guide to Mapping Units" at the back of this survey lists the pages on which each management group, and also special groups such as woodland groups and recreation groups, are described.

TABLE 4.—*Approximate acreage and proportionate extent of the soils*

Soil	Edwards County		Richland County		Total of survey area	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Alford silt loam, 2 to 4 percent slopes	462	0. 3			462	0. 1
Alford silt loam, 4 to 7 percent slopes, eroded	860	. 6			860	. 2
Alford silt loam, 7 to 16 percent slopes, eroded	615	. 4			615	. 2
Alford silt loam, 18 to 30 percent slopes, eroded	102	. 1			102	[1]
Allison silty clay loam			243	0. 1	243	. 1
Alvin fine sandy loam, 1 to 4 percent slopes	185	. 1	151	. 1	336	. 1
Alvin fine sandy loam, 4 to 12 percent slopes, eroded	150	. 1	120	. 1	270	. 1
Ava silt loam, 2 to 4 percent slopes	6, 579	4. 6	7, 431	3. 2	14, 010	3. 7
Ava silt loam, 2 to 4 percent slopes, eroded	983	. 7	809	. 3	1, 792	. 5
Ava silt loam, 4 to 7 percent slopes	989	. 7	880	. 4	1, 869	. 5
Ava silt loam, 4 to 7 percent slopes, eroded	3, 860	2. 6	4, 494	1. 9	8, 354	2. 2
Ava silt loam, 7 to 12 percent slopes, eroded	1, 935	1. 3	1, 058	. 5	2, 993	. 8
Ava soils, 4 to 7 percent slopes, severely eroded	120	. 1	314	. 1	434	. 1
Belknap silt loam	20, 095	14. 0	20, 204	8. 7	40, 299	10. 7
Blair silt loam, 4 to 7 percent slopes, eroded	376	. 3	5, 675	2. 4	6, 051	1. 6
Blair silt loam, 7 to 12 percent slopes, eroded	3, 220	2. 2	3, 229	1. 4	6, 449	1. 7
Blair soils, 4 to 7 percent slopes, severely eroded	1, 042	. 7	5, 038	2. 2	6, 080	1. 6
Blair soils, 7 to 12 percent slopes, severely eroded	3, 330	2. 3	4, 348	1. 9	7, 678	2. 0
Bluford silt loam, 0 to 2 percent slopes	513	. 4	4, 068	1. 7	4, 581	1. 2
Bluford silt loam, 2 to 4 percent slopes	14, 731	10. 2	30, 887	13. 3	45, 618	12. 1
Bluford silt loam, 2 to 4 percent slopes, eroded	1, 885	1. 3	5, 054	2. 2	6, 939	1. 8
Bluford silt loam, 4 to 7 percent slopes, eroded	4, 616	3. 2	3, 956	1. 7	8, 572	2. 3
Bonnie silt loam	4, 790	3. 3	8, 933	3. 8	13, 723	3. 6
Camden silt loam, 0 to 2 percent slopes	188	. 1	84	[1]	272	. 1
Camden silt loam, 2 to 7 percent slopes	240	. 2	56	[1]	296	. 1
Chauncey silt loam	3, 188	2. 2	621	. 3	3, 809	1. 0
Cisne silt loam	2, 584	1. 8	46, 389	19. 9	48, 973	13. 0
Coffeen silt loam	1, 694	1. 2	392	. 2	2, 086	. 6

TABLE 4.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Edwards County		Richland County		Total of survey area	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Darwin silty clay	546	. 4	344	. 1	890	. 2
Ebbert silt loam			480	. 2	480	. 1
Grantsburg silt loam, 2 to 4 percent slopes	3, 371	2. 3			3, 371	. 9
Grantsburg silt loam, 4 to 7 percent slopes	927	. 6			927	. 2
Grantsburg silt loam, 4 to 7 percent slopes, eroded	2, 071	1. 4			2, 071	. 6
Hickory loam, 7 to 12 percent slopes, eroded	790	. 6	1, 734	. 7	2, 524	. 7
Hickory loam, 12 to 18 percent slopes, eroded	1, 211	. 8	2, 795	1. 2	4, 006	1. 1
Hickory loam, 18 to 30 percent slopes, eroded	271	. 2	2, 640	1. 1	2, 911	. 8
Hickory soils, 7 to 12 percent slopes, severely eroded	1, 084	. 8	3, 870	1. 7	4, 954	1. 3
Hickory soils, 12 to 30 percent slopes, severely eroded	2, 413	1. 7	3, 704	1. 6	6, 117	1. 6
Hosmer silt loam, 2 to 4 percent slopes	2, 822	2. 0			2, 822	. 8
Hosmer silt loam, 4 to 7 percent slopes, eroded	2, 658	1. 8			2, 658	. 7
Hosmer silt loam, 7 to 12 percent slopes, eroded	1, 456	1. 0			1, 456	. 4
Hosmer silt loam, 12 to 18 percent slopes, eroded	199	. 1			199	. 1
Hosmer soils, 7 to 12 percent slopes, severely eroded	897	. 6			897	. 2
Hoyleton silt loam, 0 to 2 percent slopes	726	. 5	4, 217	1. 8	4, 943	1. 3
Hoyleton silt loam, 2 to 4 percent slopes	7, 094	4. 9	21, 659	9. 3	28, 753	7. 6
Hoyleton silt loam, 2 to 4 percent slopes, eroded	944	. 7	2, 936	1. 3	3, 880	1. 0
Hoyleton silt loam, 4 to 7 percent slopes, eroded	1, 147	. 8	1, 651	. 7	2, 798	. 7
Huey silt loam, 0 to 2 percent slopes			904	. 4	904	. 2
Huey silt loam, 2 to 4 percent slopes, eroded			1, 123	. 5	1, 123	. 3
Huey soils, 2 to 7 percent slopes, severely eroded			501	. 2	501	. 1
Lukin silt loam	243	. 2	13	(1)	256	. 1
Marissa silt loam	712	. 5			712	. 2
McGary silt loam, 0 to 2 percent slopes	775	. 5			775	. 2
McGary silt loam, 2 to 4 percent slopes eroded	393	. 3			393	. 1
McGary silt loam, 4 to 10 percent slopes, eroded	354	. 2			354	. 1
McGary soils, 4 to 10 percent slopes, severely eroded	199	. 1			199	. 1
Montgomery silty clay	3, 923	2. 1			3, 023	. 8
Newberry silt loam			1, 752	. 8	1, 752	. 5
Patton silty clay loam	4, 625	3. 2			4, 625	1. 2
Petrolia silty clay loam	1, 285	. 9	1, 610	. 7	2, 895	. 8
Racoon silt loam	3, 295	2. 3	1, 510	. 6	4, 805	1. 3
Reesville silt loam, 0 to 2 percent slopes	1, 435	1. 0			1, 435	. 4
Reesville silt loam, 2 to 4 percent slopes	707	. 5			707	. 2
Reesville silt loam, 4 to 7 percent slopes, eroded	197	. 1			197	. 1
Richview silt loam, 2 to 4 percent slopes	67	. 1	340	. 1	407	. 1
Richview silt loam, 4 to 7 percent slopes, eroded	52	(1)	275	. 1	327	. 1
Robbs silt loam, 1 to 4 percent slopes	1, 255	. 9			1, 255	. 3
Robbs silt loam, 4 to 7 percent slopes, eroded	313	. 2			313	. 1
Sexton silt loam	1, 550	1. 1			1, 550	. 4
Shale rock land			112	(1)	112	(1)
Sharon silt loam			1, 149	. 5	1, 149	. 3
Stoy silt loam, 0 to 2 percent slopes	215	. 2			215	. 1
Stoy silt loam, 2 to 4 percent slopes	2, 086	1. 5			2, 086	. 6
Stoy silt loam, 4 to 7 percent slopes, eroded	860	. 6			860	. 2
Tamalco silt loam, 0 to 2 percent slopes			357	. 2	357	. 1
Tamalco silt loam, 2 to 4 percent slopes, eroded			927	. 4	927	. 2
Tamalco soils, 3 to 7 percent slopes, severely eroded			410	. 2	410	. 1
Wakeland silt loam	1, 384	1. 0	653	. 3	2, 037	. 5
Wellston silt loam, 12 to 18 percent slopes, eroded	234	. 2	17	(1)	251	. 1
Wellston silt loam, 18 to 30 percent slopes, eroded	385	. 3	32	(1)	417	. 1
Wellston soils, 7 to 12 percent slopes, severely eroded	311	. 2			311	. 1
Wellston soils, 12 to 30 percent slopes, severely eroded	1, 065	. 7	29	(1)	1, 094	. 3
Wynoose silt loam	2, 197	1. 5	20, 439	8. 8	22, 636	6. 0
Zanesville silt loam, 7 to 12 percent slopes, eroded	2, 395	1. 7			2, 395	. 6
Zanesville silt loam, 12 to 18 percent slopes, eroded	1, 133	. 8			1, 133	. 3
Zanesville soils, 7 to 12 percent slopes, severely eroded	1, 112	. 8			1, 112	. 3
Water	174	. 1	309	. 1	483	. 1
Shale quarry	10	(1)			10	(1)
Abandoned coal strip mine			34	(1)	34	(1)
Total	144, 000	100. 0	232, 960	100. 0	376, 960	100. 0

[1] Less than 0.1 percent.

Alford Series

The Alford series consists of deep, well-drained soils. These soils occur on uplands and are gently sloping to steep. They formed in loess more than 85 inches thick.

In a typical profile the surface layer is brown silt loam about 6 inches thick. The subsurface layer is dark yellowish-brown silt loam about 5 inches thick. The next layer is about 54 inches thick. In sequence from the top, the upper 6 inches is yellowish-brown, friable silt loam; the next 21 inches is brown, firm silty clay loam; and the lower 27 inches is yellowish-brown, friable silty clay loam. The underlying material is yellowish-brown silt loam to a depth of about 85 inches.

Alford soils are low in organic-matter content. They are medium in natural fertility, are moderately permeable, and have high available water capacity.

Representative profile of Alford silt loam, 2 to 4 percent slopes, NE2½, NW10, NE40, SE160, sec. 27, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; strong, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—6 to 11 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

B1—11 to 17 inches, yellowish-brown (10YR 5/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—17 to 26 inches, brown (7.5YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; discontinuous films of dark-brown (10YR 3/3) clay on ped surfaces; strongly acid; clear, smooth boundary.

B22t—26 to 38 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; discontinuous films of brown (10YR 4/3) clay on ped surfaces; strongly acid; gradual, smooth boundary.

B3—38 to 65 inches, yellowish-brown (10YR 5/4 and 5/6) light silty clay loam; common, medium, faint mottles of dark yellowish brown (10YR 4/4) and common, fine, faint mottles of pale brown (10YR 6/3); weak, coarse, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

C—65 to 85 inches, yellowish-brown (10YR 5/4 and 5/8) silt loam; few, fine, faint mottles of brown (7.5YR 4/4); massive; friable; medium to slightly acid.

The Ap horizon generally is the same thickness as the plowing depth. The combined thickness of the Ap and A2 horizons ranges from 0 to 18 inches, but generally is 6 to 14 inches. The Ap horizon normally is silt loam, but in some eroded soils it is light silty clay loam. The thickness of loess ranges from 85 to more than 100 inches. Below the loess is Illinoian glacial till or sandstone residual material. Iron and manganese concretions are few to common in all horizons. Reaction ranges from medium acid to strongly acid in the B horizon and generally from medium acid to neutral in the C horizon. In places the C horizon is mildly alkaline.

Alford soils are underlain by loess; Camden soils are underlain by stratified outwash material. Hosmer soils have a fragipan and gray mottles in the lower part of the subsoil; Alford soils do not.

Alford silt loam, 2 to 4 percent slopes (308B).—This soil has the profile described as typical for the series. Runoff is medium. Included with this soil in mapping is a small acreage of soils that have gray mottles in the lower part of the subsoil. These included soils occur mostly on foot slopes.

This soil is suited to all the crops commonly grown in the two counties. Erosion and low fertility are the major limitations to use. Where erosion is controlled by terracing and by plowing on the contour, this soil can be intensively cultivated. (Management group IIe–1)

Alford silt loam, 4 to 7 percent slopes, eroded (308C2).—This soil has lost some of the original surface and subsurface layers through erosion, and in places the plow layer consists partly of subsoil material. Runoff is medium. Included in mapping are small areas where this soil is only slightly eroded. Also included on the lower part of long slopes are soils that are mottled in the lower part of the subsoil.

This soil is suited to all the crops commonly grown in the two counties. Erosion and low fertility are the main limitations to use. (Management group IIe–1)

Alford silt loam, 7 to 16 percent slopes, eroded (308D2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. In places the plow layer consists partly of subsoil material. Runoff is medium to rapid. Included in mapping are very small areas where this soil is only slightly eroded and areas where this soil is severely eroded.

This soil is suited to all the crops commonly grown in the two counties. Areas at the head of drainageways are better suited to small grains, grasses, and legumes. Erosion and low fertility are the main limitations to use. This soil generally has long slopes and is well suited to terracing and contour stripcropping. (Management group IIIe–2)

Alford silt loam, 18 to 30 percent slopes, eroded (308F2).—Depth to the subsoil is less in this soil than in the profile described as typical for the series. Runoff is rapid. Included in mapping are small areas where this soil is only slightly eroded.

This soil is mostly wooded and is managed for timber. Cleared areas are suited to permanent pasture. Less sloping areas of this soil are used for small grains. The main limitations to use are erosion, low fertility, and steep slopes. Equipment is difficult to use on steep soils. (Management group VIe–1)

Allison Series

The Allison series consists of deep, moderately well drained and well drained, nearly level soils that formed in water-laid sediments. These soils occur on bottom lands in the northeastern part of Richland County.

In a typical profile the surface layer is very dark grayish-brown silty clay loam about 12 inches thick. Below the surface layer is silty clay loam, about 18 inches thick, that is dark brown in the upper part and brown in the lower part. The next layer is brown silt loam about 12 inches thick. The underlying material to a depth of about 60 inches is stratified, brown and dark-brown silt loam, loam, and silty clay loam.

Allison soils are low to medium in organic-matter content and medium to high in natural fertility. They have high available water capacity and moderate permeability. These soils are subject to flooding.

Representative profile of Allison silty clay loam, NE2½, SE10, SE40, NE160, sec. 28, T. 5 N., R. 14 W., in a cultivated field:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; weak, fine, crumb structure; friable; neutral; abrupt, smooth boundary.

A1—6 to 12 inches, very dark grayish-brown (10YR 3/2) silty clay loam that has small spots of very dark brown (10YR 2/2); weak, fine and medium, subangular blocky structure that breaks to fine, crumb; friable; neutral; clear, smooth boundary.

B21—12 to 24 inches, dark-brown (10YR 3/3) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; slightly acid; gradual, smooth boundary.

B22—24 to 30 inches, brown (10YR 4/3) light silty clay loam; very few, fine, faint mottles of yellowish brown (10YR 5/4), grayish brown (10YR 5/2), and dark brown (7.5YR 4/4); weak, medium, subangular blocky structure; firm; slightly acid; gradual, smooth boundary.

B3—30 to 42 inches, brown (10YR 4/3) heavy silt loam; few, fine, faint mottles of pale brown (10YR 6/3); weak, coarse, subangular blocky structure; firm; slightly acid; gradual, smooth boundary.

C—42 to 60 inches, stratified, brown (10YR 4/3) and dark-brown (7.5YR 4/4) silt loam, loam, and silty clay loam; common, medium, faint mottles of pale brown (10YR 6/3) and a few, medium, faint mottles of grayish brown (10YR 5/2); massive; friable; slightly acid.

The Ap horizon ranges from medium silty clay loam to heavy silt loam in texture. Where Allison soils grade toward Petrolia soils, the surface layer is lighter colored and mottling occurs nearer the surface. Reaction of the B horizons ranges from neutral to medium acid.

Allison soils are darker colored than Sharon soils and contain more clay.

Allison silty clay loam (0 to 2 percent slopes) (306).—This soil has the profile described as typical for the series. Runoff is slow, and flooding is the only hazard.

This soil can be used intensively for crops, especially summer annuals. Damaging floods may occur during the growing season. Weed control generally is needed for row crops. (Management group I–1)

Alvin Series

The Alvin series consists of deep, well drained and moderately well drained sandy loam soils that formed in material deposited by wind and water on uplands and terraces. These soils are nearly level to strongly sloping.

In a typical profile the surface layer is brown fine sandy loam about 8 inches thick. The subsurface layer is yellowish-brown fine sandy loam about 10 inches thick. The next layer is about 22 inches thick. In sequence from the top, the upper 7 inches of this 22-inch layer is yellowish-brown sandy loam; the next 10 inches is brown sandy clay loam; and the lower 5 inches is brown sandy loam. The underlying material to a depth of about 65 inches is yellowish-brown loamy sand.

Alvin soils are low in organic-matter content and natural fertility. The solum is moderately permeable, and the underlying layers are rapidly permeable. Available water capacity is moderate.

Representative profile of Alvin fine sandy loam, 1 to 4 percent slopes, SW10, SW40, SE160, sec. 34, T. 2 S., R. 14 W., in a pasture:

Ap—0 to 8 inches, brown (10YR 4/3) fine sandy loam; weak, medium, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—8 to 18 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, medium, crumb structure; friable; medium acid; clear, smooth boundary.

B1—18 to 25 inches, yellowish-brown (10YR 5/6 and 5/8) sandy loam; weak to moderate, medium, subangular blocky structure; firm; few, discontinuous films of brown (7.5YR 4/4) clay on ped surfaces; medium acid; clear, smooth boundary.

B2t—25 to 35 inches, brown (7.5YR 4/4) light sandy clay loam; moderate, medium, subangular blocky structure; firm; few, discontinuous films of brown (7.5YR 4/4) clay on ped surfaces; strongly acid; clear, smooth boundary.

B3—35 to 40 inches, brown (7.5YR 4/4) sandy loam; few, fine, faint mottles of yellowish brown (10YR 5/6); weak, medium and coarse, subangular blocky structure; firm; strongly acid; abrupt, smooth boundary.

C1—40 to 65 inches, yellowish-brown (10YR 5/6 and 5/8) loamy sand; single grain; loose; several lenses less than 1 inch thick of brown (7.5YR 4/4) sandy clay loam; strongly acid; gradual, smooth boundary.

C2—65 to 75 inches, yellowish-brown (10YR 5/4) loose sand; single grain; medium acid.

The combined thickness of the Ap and A2 horizons ranges from 5 to 25 inches, but is commonly 12 to 20 inches. The Ap horizon is mainly fine sandy loam, but it is loam in some nearly level soils and loamy sand in some moderately sloping soils. Reaction of the B horizons ranges from slightly to strongly acid. The B2 horizon ranges from sandy loam to clay loam. Alvin soils are more sandy than Camden and Alford soils.

Alvin fine sandy loam, 1 to 4 percent slopes (131B).—This soil has the profile described as typical for the series. Runoff is slow to medium. Included in mapping are small areas where the subsoil is mottled and small areas, mostly on uplands, where the soil is more silty and more sandy than typical.

This soil is mostly cultivated. Some small areas are in pasture or are wooded. Where fertilized and irrigated, this soil is well suited to crops, especially melons. This soil is well suited to sprinkler irrigation. Management is needed to control erosion on sloping soils. (Management group IIe–1)

Alvin fine sandy loam, 4 to 12 percent slopes, eroded (131C2).—The combined thickness of the surface and subsurface layers of this soil is commonly about 7 inches. It is less than that in the profile described as typical for the series. Runoff is medium. Included with this soil in mapping are small areas of more sandy soils. Also included are silty soils, mostly on uplands, and sandy escarpments on bottom lands.

This soil is suited to small grains, hay, and improved pasture. A row crop can be grown occasionally. The main limitations to use are erosion, low fertility, and droughtiness. Less steep soils are suited to sprinkler irrigation. Because slopes are irregular, contouring and terracing to control erosion generally are not practical. If well managed, stands of adapted pine trees grow well on this soil. (Management group IIIe–2)

Ava Series

The Ava series consists of deep, moderately well drained, gently to strongly sloping soils that have a fragipan (fig. 6). These soils formed in 20 to 50 inches of loess deposited over Illinoian glacial till. They occur on uplands in both counties. Gently sloping Ava soils are between

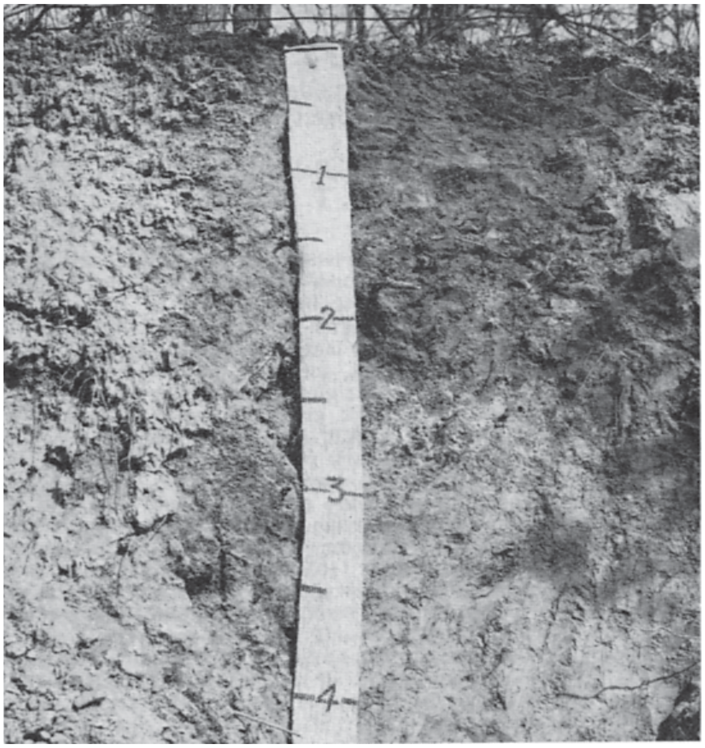

Figure 6.—Profile of an Ava silt loam.

drainageways, and moderately and strongly sloping soils are on the sides of drainageways and of low, rounded hills.

In a typical profile, the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The next layer is yellowish-brown silty clay loam, about 14 inches thick. The next layer is yellowish-brown silty clay loam about 10 inches thick. Below this layer is grayish-brown and brown silty clay loam about 10 inches thick. The underlying material to a depth of about 60 inches is brown silty clay loam mottled with dark yellowish brown and grayish brown.

Ava soils are low in organic-matter content and natural fertility. They are slowly permeable and have moderate available water capacity. Plant roots are somewhat restricted by the compact fragipan.

Representative profile of Ava silt loam, 2 to 4 percent slopes, NE2½, SE10, NW40, NE160, sec. 17, T. 1 N., R. 10 E., in a pasture:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—6 to 10 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

B1—10 to 14 inches, yellowish-brown (10YR 5/6) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B2t—14 to 24 inches, yellowish-brown (10YR 5/4) silty clay loam; strong, fine and medium, subangular blocky structure; firm; very few, thin, discontinuous films of brown (7.5YR 5/4) clay and coatings of light yellowish-brown (10YR 6/4) silt on ped surfaces; very strongly acid; clear, smooth boundary.

A'2—24 to 27 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, faint mottles of brown (7.5YR 4/4); moderate, fine and medium, subangular blocky structure; firm; moderately thick, discontinuous coatings of light yellowish-brown (10YR 6/4) silt on ped surfaces; coatings light gray (10YR 7/2) when dry; very strongly acid; clear, smooth boundary.

B'2t—27 to 34 inches, dark yellowish-brown (10YR 4/4) silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2) and a few, fine, faint mottles of yellowish brown (10YR 5/6 and 5/8); moderate, medium, subangular blocky structure; firm; common, moderately thick, discontinuous films of dark-brown and brown (10YR 4/3) clay and a few discontinuous coatings of light-gray (10YR 7/2) silt on ped surfaces; very strongly acid; gradual, smooth boundary.

IIB'x—34 to 44 inches, grayish-brown (10YR 5/2) to brown (10YR 5/3) gritty silty clay loam; common, large, distinct mottles of yellowish brown (10YR 5/8); weak, coarse, subangular blocky structure; firm and brittle; few, narrow streaks of light gray (10YR 7/1); common, large, soft, dark-red (2.5YR 3/6) and brown (7.5YR 4/4) accumulations of iron; few, small, black (10YR 2/1) stains of iron and manganese; very strongly acid; gradual, smooth boundary.

IIC—44 to 60 inches, brown (10YR 5/3) gritty light silty clay loam; common, coarse, faint mottles of dark yellowish brown (10YR 4/4) and common, fine, faint mottles of grayish brown (10YR 5/2); massive or very weak, coarse, subangular blocky structure; firm; few, black (10YR 2/1) stains of iron and manganese; very strongly acid.

The combined thickness of the Ap and A2 horizons ranges from 0 to about 18 inches, but is commonly 7 to 14 inches. The Ap horizon is generally silt loam, but in eroded soils it may consist partly or entirely of subsoil material. Concretions of iron and manganese are few to many. Reaction of the B horizons ranges from medium to very strongly acid. In places the B2 horizon is extremely acid. Depth to the fragipan ranges from 24 to 36 inches.

The surface layer of Ava soils is lighter colored than that of Richview soils, and Richview soils do not have a fragipan. Ava soils formed in loess and glacial till, whereas the Grantsburg soils formed in loess and residual sandstone, the Hosmer soils formed entirely in loess, and the Hickory soils formed in glacial till and do not have a fragipan. The fragipan in Ava soils is more weakly developed than that in Grantsburg soils.

Ava silt loam, 2 to 4 percent slopes (14B).—This soil has the profile described as typical for the series. In wooded areas, this soil has a thinner, darker surface layer than is typical. Runoff is medium. Included in mapping are small areas where this soil is level. Also included are small areas of a well-drained soil that has no fragipan.

This soil is used mostly for corn, soybeans, wheat, and hay or meadow. Some areas are in permanent pasture or are in trees. This soil is easy to work. The main limitations to use are erosion and low fertility. Where adequately fertilized and protected from erosion, this soil can be cultivated intensively. (Management group IIe-2)

Ava silt loam, 2 to 4 percent slopes, eroded (14B2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. In places the plow layer consists mainly of yellowish-brown subsoil material. Runoff is medium. Included with this soil in mapping are small areas of severely eroded Ava soils.

Where fertilized and protected from erosion, this soil is suited to all crops commonly grown in the two counties.

The main limitations to use are erosion, low fertility, and, in places, poor tilth. (Management group IIe-2)

Ava silt loam, 4 to 7 percent slopes (14C).—This soil has a profile similar to that described as typical for the series, but this soil is more sloping. In wooded areas, the surface layer is thinner and darker than is typical. Runoff is medium.

This soil is suited to corn, soybeans, small grains, forage grasses and legumes. Areas in trees can be managed for timber. The main limitations to use are erosion and low fertility. (Management group IIIe-3)

Ava silt loam, 4 to 7 percent slopes, eroded (14C2).—This soil has lost most of the original surface layer through erosion. The plow layer consists partly of yellowish-brown subsoil material. Runoff is medium. Included with this soil in mapping is a very small acreage of a well-drained soil that has no fragipan.

Where protected from erosion this soil is suited to all the crops commonly grown in the two counties. The main limitations to use are erosion, low fertility, and, in places, poor tilth. Planting grasses and legumes frequently in the cropping system helps to control erosion. Contouring and terracing generally are practical on soils that occur on the sides of rounded hills, but these practices generally are not practical on soils that occur on the sides of drainageways. (Management group IIIe-3)

Ava silt loam, 7 to 12 percent slopes, eroded (14D2).—The surface layer of this soil generally is thinner than that described as typical for the series. The plow layer consists partly of subsoil material. In wooded areas, this soil has a thinner, darker surface layer than is typical. Included in mapping are areas where this soil is only slightly eroded or is not eroded. These areas make up about 12 percent of the total acreage mapped and generally are wooded. Runoff is medium.

This soil is well suited to pasture and hay. The main limitations to use are erosion and low fertility. Poor tilth also is a limitation in areas where the subsoil has been plowed up. Soils on long slopes can be cultivated intensively if erosion is controlled by contour stripcropping. (Management group IIIe-3)

Ava soils, 4 to 7 percent slopes, severely eroded (14C3).—The soils are so badly eroded that the yellowish-brown subsoil is at the surface and generally makes up the entire plow layer. The surface layer ranges from silt loam to silty clay loam in texture. Runoff is rapid. Included with these soils in mapping are small spots of Blair and Hickory soils.

The main limitations to use of these soils are erosion, low fertility, and poor tilth. Drought commonly is a hazard for summer crops, such as corn and soybeans. These soils are better suited to small grains, forage grasses, and legumes. (Management group IVe-3)

Belknap Series

The Belknap series consists of deep, nearly level, somewhat poorly drained, slightly acid to strongly acid soils. These soils formed in silty sediments deposited by water on bottom lands throughout the two counties.

In a typical profile the surface layer is dark grayish-brown silt loam about 15 inches thick. The next layer is silt loam about 25 inches thick; it is dark grayish brown to grayish brown in the upper part and grayish brown to gray in the lower part. The underlying material to a depth of about 60 inches is grayish-brown silt loam.

Belknap soils are low in organic-matter content and natural fertility. They have moderately slow permeability and high available water capacity. Belknap soils are subject to flooding.

Representative profile of Belknap silt loam, NE2½, NE10, SE40, NE160, sec. 10, T. 2 S., R. 10 E., in a cultivated field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—6 to 15 inches, dark grayish-brown (10YR 4/2) silt loam; common, fine, faint mottles of dark yellowish brown (10YR 4/4); weak, medium, crumb structure; friable; strongly acid; clear, smooth boundary.

B1g—15 to 29 inches, dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) silt loam; many, fine, faint mottles of dark yellowish brown (10YR 4/4); massive or weak, blocky structure; friable; iron stains; strongly acid; gradual, smooth boundary.

B2g—29 to 40 inches, grayish-brown (10YR 5/2) to gray (10YR 5/1) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/6) and a few, fine, faint mottles of light brownish gray (10YR 6/2); massive or weak, blocky structure; friable; iron stains; strongly acid; gradual, smooth boundary.

Cg—40 to 60 inches, grayish-brown (2.5Y 5/2) silt loam; few, fine, distinct mottles of strong brown (7.5YR 5/6 and 5/8); massive; common iron stains; friable; very strongly acid.

The Ap horizon is normally silt loam, but in a few places is loam. Where Belknap soils grade to Petrolia soils, the Ap horizon may be light silty clay loam. The combined thickness of the Ap and A1 horizons ranges from about 6 inches to 20 inches. Reaction of the B1g and B2g horizons ranges from very strongly acid to medium acid. Few to many iron and manganese concretions are in all horizons.

Belknap soils are more acid than Wakeland and Petrolia soils, and they are not so clayey as Petrolia soils. The surface layer of Belknap soils is lighter colored than that of Coffeen soils.

Belknap silt loam (0 to 2 percent slopes) (382).—This soil is flooded on an average of once every three years. Runoff is slow. Included in mapping are small areas where this soil is gently sloping.

This soil is suited to all the crops commonly grown in the two counties. Where unprotected from winter floods, this soil can be used only for summer annual crops. The main limitations to use are flooding, low fertility, and wetness. (Management group IIw-3)

Blair Series

The Blair series consists of deep, somewhat poorly drained, moderately sloping to strongly sloping soils on uplands. These soils occur mainly on the sides of drainageways. Most Blair soils formed in glacial till, but some soils formed in loess that had been deposited over the glacial till.

In a typical profile the surface layer is yellowish-brown silt loam about 5 inches thick. The next layer is mottled clay loam and gritty silty clay loam about 60 inches thick. In sequence from the top, the upper 15 inches is dark yellowish brown, the next 17 inches is grayish brown, and the lower 28 inches is gray. The underlying material to a depth of about 70 inches is clay loam that is gray, strong brown, and yellowish brown.

Blair soils are very low in organic-matter content. They are slowly permeable, are low in natural fertility, and have a high available water capacity. The clayey subsoil generally makes up part or all of the plow layer. Slopes are generally short, and the soils are seepy early in spring.

Representative profile of Blair silt loam, 4 to 7 percent slopes, eroded, SW10, SW40, SW160, sec. 36, T. 1 N., R. 10 E., in a cultivated field:

Ap—0 to 5 inches, yellowish-brown (10YR 5/4) silt loam; some grit and a few, fine, faint mottles of very pale brown (10YR 7/3); weak, medium, subangular blocky structure; friable; strongly acid; abrupt, smooth boundary.

B1—5 to 9 inches, dark yellowish-brown (10YR 4/4) gritty silty clay loam; many, large, distinct mottles of light brownish gray (10YR 6/2) and common, medium, distinct mottles of strong brown (7.5YR 5/6 and 5/8); moderate, thick, platy structure; firm; very strongly acid; clear, smooth boundary.

B21t—9 to 20 inches, dark yellowish-brown (10YR 4/4) clay loam to gritty silty clay loam; many, medium, distinct mottles of light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6 and 5/8); moderate, medium, subangular blocky structure; firm; films of dark-brown (7.5YR 3/2) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B22t—20 to 28 inches, grayish-brown (10YR 5/2) clay loam to heavy gritty silty clay loam; common, medium, prominent mottles of dark reddish brown (5YR 3/4) and common, medium, distinct mottles of strong brown (7.5YR 5/6 and 5/8); moderate, medium, subangular blocky structure; firm; films of dark-brown (7.5YR 3/2) clay on ped surfaces; extremely acid; clear, smooth boundary.

B23t—28 to 37 inches, grayish-brown (10YR 5/2) clay loam to gritty silty clay loam; many, large, prominent mottles of dark reddish brown (5YR 3/4) and strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; firm; films of dark grayish-brown (10YR 4/2) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B24t—37 to 53 inches, gray (10YR 5/1) clay loam to gritty silty clay loam; common, medium, prominent mottles of yellowish red (5YR 4/8) and strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; firm; films of dark grayish-brown (10YR 4/2) clay on ped surfaces; strongly acid; gradual, smooth boundary.

B3—53 to 65 inches, gray (10YR 5/1) clay loam to gritty silty clay loam; common, medium, prominent mottles of strong brown (7.5YR 5/6); weak, coarse, subangular blocky structure; firm; strongly acid; gradual, smooth boundary.

C—65 to 70 inches, gray (10YR 5/1), strong-brown (7.5YR 5/6), and yellowish-brown (10YR 5/4) clay loam; some gravel; massive; firm; medium acid.

Where this soil is not cultivated, the A horizon is grayish-brown (10YR 5/2) gritty silt loam about 6 inches thick. The Ap horizon generally consists partly or entirely of subsoil material. Iron and manganese concretions generally are common to many in all horizons. Most Blair soils formed in till, whereas Bluford soils formed mainly in loess. Blair soils have poorer natural drainage than Hickory soils.

Blair silt loam, 4 to 7 percent slopes, eroded (5C2).—This soil has the profile described as typical for the series. Where wooded or in permanent pasture, this soil has a slightly darker and thicker surface layer than is typical. In places the subsoil is more clayey than is typical. Runoff is medium. Included with this unit in mapping are small areas where slopes are 2 to 4 percent.

This soil is suited to small grains, hay, and pasture. Erosion and low fertility are the main limitations to use. Practices to control erosion, such as terracing and contouring, generally are not practical because slopes are short and irregular. (Management group IVe–1)

Blair silt loam, 7 to 12 percent slopes, eroded (5D2).—This soil has a profile similar to that described as typical for the series, except that in wooded areas it has a slightly thicker and darker surface layer than is typical. Also, in places the subsoil is more clayey than is typical. Runoff is rapid. Included with this soil in mapping are small areas of Hickory loam, 7 to 12 percent slopes, eroded.

Wooded areas of this soil can be managed for timber. Cleared areas are suitable for hay or pasture. Small grains can be grown in the cropping system. Erosion and low fertility are the major limitations to use. (Management group IVe–1)

Blair soils, 4 to 7 percent slopes, severely eroded (5C3).—This soil has a profile similar to that described as typical for the series, except that the original surface layer has been removed by erosion. The plow layer consists of subsoil material. The surface layer of undisturbed soil ranges from silt loam to heavy clay loam in texture. Runoff is rapid. Included with this soil in mapping are small areas of severely eroded Hickory soils.

This soil is suited to close-growing crops such as small grains, forage grasses, and legumes. Erosion is a severe hazard where row crops are grown. The main limitations to use of this soil are erosion and low fertility. Poor tilth also is a limitation, because the surface layer is clayey and is low in organic-matter content. (Management group IVe–1)

Blair soils, 7 to 12 percent slopes, severely eroded (5D3).—This soil has a profile similar to that described as typical for the series, except that the original surface layer has been removed by erosion. The plow layer ranges from silt loam to heavy clay loam in texture, and in places the subsoil is more clayey than that described as typical for the series. Runoff is rapid. Included with this soil in mapping are small areas of Hickory soils, 7 to 12 percent slopes, severely eroded.

This soil is suited to permanent pasture and hay. Small grains can be grown to reestablish grasses and legumes. The major limitations to use are erosion, low natural fertility, and poor tilth. In spring, soils on the lower part of slopes are seepy. (Management group VIe–1)

Bluford Series

The Bluford series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils (fig. 7). These soils are on uplands in both counties, but the areas of these soils in the southern part of Edwards County are small. They occupy ridgetops, sides of drainageways, and foot slopes below steeper soils. Bluford soils formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 7 inches thick. Below this layer is silty clay loam about 27 inches thick. It is pale brown mottled with grayish brown in the upper part; brown mottled with grayish brown and brownish gray in the middle part; and grayish brown to brown mottled with

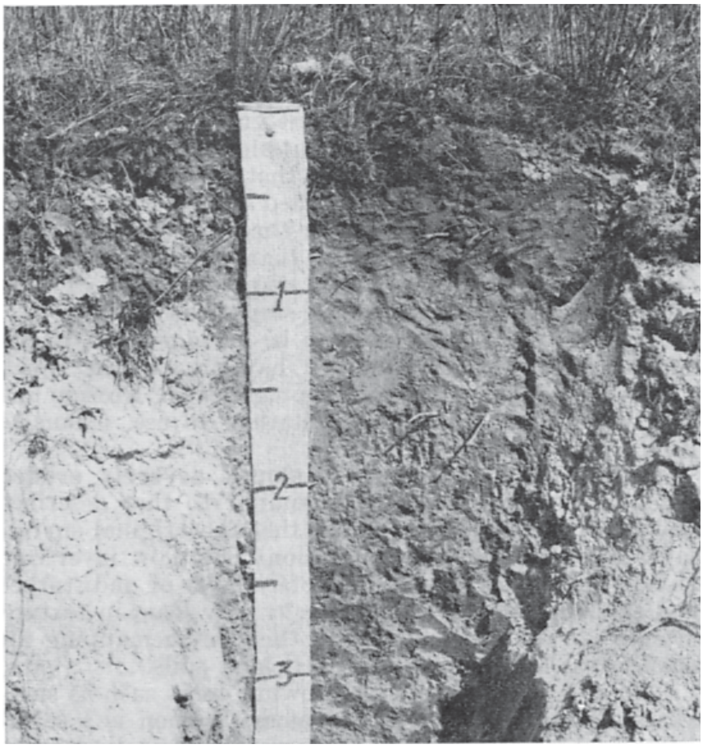

Figure 7.—Profile of a Bluford silt loam.

yellowish brown in the lower part. The next layer is dark yellowish-brown light silty clay loam about 10 inches thick. The underlying material to a depth of about 60 inches is dark yellowish-brown silt loam.

Bluford soils are low in organic-matter content and natural fertility. They are slowly permeable and have high available water capacity.

Representative profile of Bluford silt loam, 2 to 4 percent slopes, NW2½, SE10, NW40, SW160, sec. 26, T. 1 S., R. 10 E., in an orchard of peach trees:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; clear, smooth boundary.

A2—6 to 13 inches, brown (10YR 5/3) silt loam; common, medium, faint mottles of light brownish gray (10YR 6/2); weak, thick, platy structure; friable; medium acid; clear, smooth boundary.

B1—13 to 20 inches, pale-brown (10YR 6/3) light silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2); moderate, fine and medium, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B21t—20 to 24 inches, brown (10YR 5/3) silty clay loam; common, medium, faint mottles of grayish brown (10YR 5/2) and a few, fine, faint mottles of dark yellowish brown (10YR 4/4); moderate, fine and medium, subangular blocky structure; very firm; coatings of light-gray (10YR 7/1) silt on some ped surfaces; very strongly acid; clear, smooth boundary.

B22t—24 to 32 inches, brown (10YR 5/3) heavy silty clay loam; common, fine, faint mottles of light brownish gray (10YR 6/2) and a few, fine, distinct mottles of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B3—32 to 40 inches, grayish-brown (10YR 5/2) to brown (10YR 5/3) silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/6 and 5/8); weak, medium and coarse, subangular blocky structure; firm; some grit in the lower 2 or 3 inches; very strongly acid; clear, smooth boundary.

IIBx—40 to 50 inches, dark yellowish-brown (10YR 4/4) heavy silt loam to light silty clay loam that has a polygonal network of bleached fracture planes of grayish brown (10YR 5/2) and light brownish gray (10YR 6/2); polygonal clods break into pieces 5 to 10 inches long; very firm; very strongly acid.

IICx—50 to 60 inches, similar to above except massive.

The combined thickness of the Ap and A2 horizons ranges from 0 to 24 inches, but commonly is 10 to 18 inches. The Ap horizon is mainly silt loam, but in eroded soils it may consist partly or entirely of subsoil material. In places the B21t horizon is extremely acid.

Bluford soils have a lighter colored surface layer than Hoyleton and Lukin soils. The solum of Bluford soils developed in loess and glacial till, but Stoy soils developed entirely in loess, and Robbs soils developed in loess and residual sandstone material.

Bluford silt loam, 0 to 2 percent slopes (13A).—This soil has a thicker subsurface layer than that in the typical profile. Depth to subsoil generally is about 16 to 18 inches. Runoff is slow.

Almost all of this soil is used for corn, soybeans, wheat, hay, and meadow. Wetness and low fertility are the major limitations to use. Erosion is a slight hazard. This soil has good tilth. (Management group IIw–2)

Bluford silt loam, 2 to 4 percent slopes (13B).—In cultivated areas this soil has the profile described as typical for the series. In wooded areas the surface layer is thinner and darker. Runoff is medium. Included with this soil in mapping are small areas of soil at the base of slopes in which depth to the subsoil is more than 24 inches.

This soil is used mostly for corn, soybeans, wheat, hay, and meadow. Some areas are in permanent pasture, and a few areas are wooded. Erosion and low fertility are the main limitations to use. Surface drainage may be needed in places. (Management group IIe–3)

Bluford silt loam, 2 to 4 percent slopes, eroded (13B2).—The combined thickness of the surface and subsurface layers of this soil is less than that described as typical for the series. In places the plow layer consists partly of subsoil material. Runoff is medium. Included in mapping are small areas where this soil is severely eroded and the plow layer consists entirely of subsoil material.

This soil is suited to all the crops commonly grown in the two counties. Drought is a hazard for summer crops. Erosion, low fertility, and, in places, poor tilth are the main limitations to use of this soil. (Management group IIIe–1)

Bluford silt loam, 4 to 7 percent slopes, eroded (13C2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. The plow layer generally consists partly of subsoil material. Runoff is medium. In wooded areas, very little erosion has occurred. These wooded areas make up about 10 percent of the acreage mapped.

This soil is suited to all the crops commonly grown in the two counties. Erosion, low fertility, and, in places, poor tilth are the major limitations to use. Contour farming and terracing generally are not practical on soils on sides of drainageways, but these practices generally are practical on soils that are on low, rounded hills. (Management group IVe–1)

Bonnie Series

The Bonnie series consists of deep, poorly drained, nearly level soils that occur on bottom lands throughout the survey area. They formed in silty sediments washed from uplands. Large areas of Bonnie soils are on the flood plains of the Little Wabash and Fox Rivers. In smaller bottoms, these soils generally occupy positions away from the streambed and nearer the bluffs.

In a typical profile the surface layer is dark grayish-brown silt loam about 6 inches thick. Below the surface layer is gray silt loam about 15 inches thick. It is mottled with dark grayish brown in the upper part and with yellowish brown in the lower part. The underlying material to a depth of about 60 inches is gray to light-gray silt loam mottled with yellowish brown.

Bonnie soils are very low in organic-matter content and natural fertility. They have high available water capacity and slow permeability.

Representative profile of Bonnie silt loam, NE10, NW40, NW160, sec. 34, T. 2 N., R. 14 W., in a cultivated field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/6) and common, medium, faint mottles of gray (10YR 5/1); moderate, fine, crumb structure; friable; medium acid; abrupt, smooth boundary.

B1g—6 to 13 inches, gray (10YR 5/1) silt loam; common, medium, faint mottles of dark grayish brown (10YR 4/2) and few, fine, distinct mottles of yellowish brown (10YR 5/6); weak, coarse, blocky structure; friable; very strongly acid; gradual, smooth boundary.

B2g—13 to 21 inches, gray (5Y 5/1) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/4) and common, medium, faint mottles of light gray (10YR 6/1); weak, coarse, blocky structure; friable; very strongly acid; gradual, smooth boundary.

Cg—21 to 60 inches, gray (5Y 5/1) to light-gray (5Y 6/1) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and a few, fine, prominent mottles of yellowish red (5YR 4/6); massive; friable; very strongly acid.

In wooded areas, the surface layer is thinner and darker than that described as typical. Reaction of the B horizons ranges from medium to extremely acid. Iron and manganese concretions are common to many in all the horizons.

Bonnie soils are more acid than Petrolia soils and not so fine textured. Bonnie soils are more acid than Wakeland soils and they have poorer natural drainage.

Bonnie silt loam (0 to 2 percent slopes) (108).—This soil is wet much of the year and most areas are flooded annually. Runoff is slow.

Cleared areas of this soil are suited to corn and soybeans. Where protected from flooding, this soil also is suited to wheat. Water-tolerant trees grow well on this soil. Wetness, flooding, and low fertility are the major limitations to use. The surface of finely worked seedbeds is likely to crust after hard rains. (Management group IIIw-2)

Camden Series

The Camden series consists of deep, moderately well drained and well drained, nearly level to moderately sloping soils on terraces. These soils formed in about 40 inches of silty material and stratified coarse sediments.

In a typical profile the surface layer is brown silt loam about 16 inches thick. The next layer is about 27 inches thick. The upper 8 inches is brown, heavy silt loam, and the next 19 inches is yellowish-brown silty clay loam that is gritty in the lower part. The underlying material is dark yellowish-brown loam to a depth of 50 inches and dark-brown and yellowish-brown loam, silt loam, and sandy loam to a depth of about 67 inches.

Camden soils are low in organic-matter content. They are medium in natural fertility, are moderately permeable, and have a high available water capacity.

Representative profile of Camden silt loam, 0 to 2 percent slopes, NE10, NW40, SE160, sec. 9, T. 3 S., R. 14 W., in a cultivated field:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—8 to 16 inches, brown (10YR 5/3 and 4/3) silt loam; weak, medium, crumb structure; friable; slightly acid; clear, smooth boundary.

B1—16 to 24 inches, brown (10YR 5/3) heavy silt loam; moderate, medium, subangular blocky structure; friable; discontinuous films of dark-brown (10YR 3/3) clay on ped surfaces; medium acid; gradual, smooth boundary.

B2t—24 to 37 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate to strong, fine, subangular blocky structure; firm; many discontinuous films of dark yellowish-brown (10YR 3/4) clay on ped surfaces; medium acid; gradual, smooth boundary.

IIB3t—37 to 43 inches, yellowish-brown (10YR 5/4) light silty clay loam that has some grit; few, fine, prominent mottles of yellowish red (5YR 4/6) and a few, fine, faint mottles of pale brown (10YR 6/3); moderate, medium, subangular blocky structure; firm; discontinuous films of dark-brown (10YR 3/3) clay on ped surfaces; medium acid; clear, smooth boundary.

IIC1—43 to 50 inches, dark yellowish-brown (10YR 4/4) loam; common, medium, faint mottles of yellowish brown (10YR 5/6); massive; friable; medium acid; clear, smooth boundary.

IIC2—50 to 67 inches, dark-brown (7.5YR 3/2) and yellowish-brown (10YR 5/4) thinly stratified sandy loam, silt loam, and loam; common, fine, faint mottles of grayish brown (10YR 5/2) and pale brown (10YR 6/3); massive or single grain; friable to loose; medium acid.

Wooded soils have a thinner, darker surface layer than that described. The Ap horizon is generally silt loam, but in some eroded soils it consists partly of yellowish-brown (10YR 5/4) subsoil material. The B horizons range from slightly acid to strongly acid. Depth to the coarse-textured C horizon ranges from 30 to 50 inches. The C horizons range from silt loam to sandy loam in the upper part and generally are loamy sand or sand below a depth of 5 or 6 feet.

Camden soils contain less sand in the solum than the Alvin soils. Camden soils formed in silty material and stratified sediments, but Alford soils formed entirely in loess.

Camden silt loam, 0 to 2 percent slopes (134A).—This soil has the profile described as typical for the series. Runoff is slow. Included in mapping are small areas where this soil is nearly level and has more mottles in the subsoil than is typical.

This soil is well suited to all the crops commonly grown in the two counties. Some small areas are used for pasture or are wooded. (Management group I-1)

Camden silt loam, 2 to 7 percent slopes (134B).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as

typical for the series. Slopes are short, and runoff is medium. Included in mapping are small areas where this soil is gently sloping and has more mottles in the subsoil than is typical. Also included, where slopes are more than 4 percent, are small areas of eroded soil in which the plow layer consists partly of subsoil material.

This soil is suited to all the crops commonly grown in the two counties. Some areas are in pasture or are wooded. Erosion is the major limitation to use of this soil. (Management group IIe-1)

Chauncey Series

The Chauncey series consists of deep, poorly drained, nearly level soils that formed in loess and silty material washed from uplands. These soils occur mostly in Edwards County. They occupy fairly broad areas at the base of steeper slopes and a few small areas on uplands.

In a typical profile the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsurface layer is silt loam about 16 inches thick. The upper part is mottled and light gray, and the lower part is brownish gray mottled with yellowish brown. The next layer is mottled, light brownish-gray silty clay loam about 22 inches thick. The underlying material to a depth of about 62 inches is mottled, light brownish-gray silt loam.

Chauncey soils are low in organic-matter content and natural fertility. They are slowly permeable and have a high available water capacity.

Representative profile of Chauncey silt loam, SE2½, NE10, NE40, NE160, sec. 27, T. 2 S., R. 10 E., in a cultivated field:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, crumb structure; friable; slightly acid; clear, smooth boundary.

A1—8 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A21—12 to 18 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint mottles of yellowish brown (10YR 5/6); weak, medium, platy structure that breaks to moderate, fine, crumb; friable; small spots of dark grayish brown (10YR 4/2); strongly acid; gradual, smooth boundary.

A22—18 to 28 inches, light-gray (10YR 7/2) silt loam; common, fine and medium, distinct mottles of yellowish brown (10YR 5/8); weak, medium, platy structure; friable; very dark brown (10YR 2/2) iron stains; very strongly acid; abrupt, smooth boundary.

B2t—28 to 40 inches, light brownish-gray (10YR 6/2) silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/4-5/8) and a few, fine, faint mottles of grayish brown (10YR 5/2); moderate, fine and medium, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B3—40 to 50 inches, light brownish-gray (10YR 6/2) light silty clay loam; common, large, faint mottles of dark yellowish brown (10YR 4/4); weak, medium, subangular blocky structure; firm; very dark brown (10YR 2/2) iron stains; medium acid; gradual, smooth boundary.

C—50 to 62 inches, light brownish-gray (10YR 6/2) silt loam; common, coarse, faint mottles of yellowish brown (10YR 5/4-5/6); massive to weak, coarse, subangular blocky structure; friable; very dark brown (10YR 2/2) iron stains; medium acid.

The combined thickness of the Ap and A1 horizons ranges from 10 to 18 inches. The combined thickness of the Ap, A1, A21, and A22 horizons is 24 to 40 inches. Iron and manganese concretions are few to many in all horizons.

Chauncey soils have a darker colored surface layer than Racoon soils. They are more poorly drained than Lukin soils. Chauncey soils have a thicker surface layer than Cisne soils. In Chauncey soils the change in texture from the subsurface layer to the subsoil is abrupt, but in Newberry soils it is not.

Chauncey silt loam (0 to 2 percent slopes) (287).—Where fertilized and drained, this soil is suited to crops. Wetness and low fertility are the major limitations to use. Tile drains are not effective because this soil is too slowly permeable, but a system of surface ditches can be used. Runoff is slow, and diversion terraces are needed in places to intercept runoff from higher soils. (Management group IIIw-1)

Cisne Series

The Cisne series consists of deep, poorly drained, nearly level soils on uplands. They formed in 20 to 50 inches of loess and Illinoian glacial till. These are the most extensive soils in the claypan prairies of the two counties.

In a typical profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is mottled silt loam about 9 inches thick; the upper part is grayish brown and the lower part is light brownish gray. The next layer is mottled silty clay loam about 34 inches thick. In sequence from the top, the upper 12 inches is grayish brown, the next 6 inches is light gray, and the lower 16 inches is light brownish gray. The underlying material to a depth of about 70 inches is mottled, grayish-brown silty clay loam.

Cisne soils are low in organic-matter content. The available water capacity is high, and permeability is slow or very slow.

Representative profile of Cisne silt loam in NE2½, NE10, NW40, SW160, sec. 32, T. 2 N., R. 10 E., in a cultivated field:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—6 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A21—9 to 14 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint mottles of yellowish brown (10YR 5/6); moderate, medium, platy structure; friable; common, dark-brown (10YR 3/3) iron stains; medium acid; clear, smooth boundary.

A22—14 to 18 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/6); weak, thick, platy structure; friable; few, dark-brown (10YR 3/3) iron stains; strongly acid; abrupt, smooth boundary.

B2&A2—18 to 20 inches, grayish-brown (10 YR 5/2) silty clay loam; common, fine, distinct mottles of strong brown (7.5YR 5/8); moderate, fine and medium, subangular blocky structure; firm; thick, nearly continuous coatings of light-gray (10YR 7/1) silt on ped surfaces; strongly acid; clear, smooth boundary.

B21t—20 to 30 inches, grayish-brown (10YR 5/2) heavy silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6) and common, fine, faint mottles of light gray (10YR 6/1); strong, fine and medium, prismatic structure that breaks to moderate, fine, subangular blocky; very firm; few, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; very strongly acid; clear, wavy boundary.

B22t—30 to 36 inches, light-gray (10YR 6/1) heavy silty clay loam; common, fine, faint mottles of dark yellowish brown (10YR 4/4) and a few, fine, faint mottles of light brownish gray (2.5Y 6/2); moderate, medium, subangular blocky structure; very firm; few, discontinuous films of gray (10YR 5/1) clay on ped surfaces; common very dark brown (10YR 2/2) concretions of iron and manganese; very strongly acid; clear, smooth boundary.

IIB3—36 to 52 inches, light brownish-gray (2.5Y 6/2) light silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure; firm; some loess and till pebbles; strongly acid; gradual, smooth boundary.

IICg—52 to 70 inches, grayish-brown (2.5Y 5/2) silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6); massive; firm; many, fine, white and reddish till pebbles; medium acid.

The combined thickness of the Ap and A1 horizons ranges from 8 to 12 inches. Where Cisne soils grade to Wynoose soils, the Ap horizon is lighter colored than that described. The combined thickness of the surface and subsurface layers is 15 to 24 inches. In places the peds in the B2 and A2 horizons are not coated with silt. Iron and manganese concretions generally are few to many in all horizons.

Cisne soils have a thinner surface layer than Chauncey soils. The surface layer of Cisne soils is darker than that of Wynoose and Huey soils and lighter than that of Ebbert soils. Cisne soils contain less exchangeable sodium than Huey soils.

Cisne silt loam (0 to 2 percent slopes) (2).—This soil has slow runoff. Included with this soil in mapping are small spots of Huey and Hoyleton soils.

Wetness and fertility are the major limitations to use of this soil. Where drained and fertilized, it is suitable for crops. (Management group IIIw–1)

Coffeen Series

The Coffeen series consists of deep, somewhat poorly drained, nearly level soils that formed in silty sediments. These soils are on bottom lands.

In a typical profile the surface layer is very dark grayish-brown silt loam about 12 inches thick. The next layer is silt loam about 24 inches thick. The upper 7 inches is dark grayish brown, the next 5 inches is mottled and grayish brown, and the lower 12 inches is mottled and light brownish gray and light gray. The underlying material to a depth of about 50 inches is mottled, light brownish-gray silt loam.

Coffeen soils are low to medium in organic-matter content and natural fertility. They are moderately permeable and have a high available water capacity. Coffeen soils are flooded once every 4 or 5 years. Floods do not damage these soils permanently.

Representative profile of Coffeen silt loam, SW2½, NW10, NW40, SE160, sec. 14, T. 2 S., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) to dark-brown (10YR 3/3) silt loam; weak, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—7 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, crumb structure; friable; medium acid; clear, smooth boundary.

B1—12 to 19 inches, dark grayish-brown (10YR 4/2) silt loam that has splotches of dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2); weak, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B2g—19 to 24 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct mottles of brown (7.5YR 4/4); weak, medium, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B3g—24 to 36 inches, light brownish-gray (10YR 6/2) and light-gray (10YR 6/1) silt loam; many, medium, distinct mottles of yellowish brown (10YR 5/8) and common, fine, distinct mottles of dark yellowish brown (10YR 4/4); very weak, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary.

C1—36 to 50 inches, light brownish-gray (10YR 6/2) compact silt loam; many, fine, distinct mottles of dark yellowish brown (10YR 3/4) and a few, fine and medium, distinct mottles of yellowish brown (10YR 5/8); massive; slightly hard when dry, friable when moist; medium acid; gradual, smooth boundary.

C2—50 to 70 inches, pale-brown (10YR 6/3) compact loam; common, fine, distinct mottles of yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4); massive; hard when dry, friable when moist; medium acid.

The Ap and A1 horizons range from very dark gray (10YR 3/1) to dark brown (10YR 4/3) in color and from 10 to 16 inches in combined thickness. The Ap horizon generally is silt loam, but in places it is loam. Iron and manganese concretions are few to many in all horizons. Reaction of the B horizons generally ranges from medium to slightly acid, but is neutral in a few places.

Coffeen soils have a darker surface layer than Wakeland and Belknap soils. Coffeen soils are darker and less clayey than Petrolia soils. Coffeen soils are darker and not so well drained as Sharon soils.

Coffeen silt loam (0 to 2 percent slopes) (428).—This soil has slow to medium runoff and is easy to work. Included with this soil in mapping are small spots of well-drained soil. Also included are small areas at the upper end of drainageways where the soil is 4 feet deep over bedrock. In small areas at the base of slopes and the upper part of drainageways the soil has a paleosol in the glacial till at a depth of 4 to 5 feet.

Where fertilized, this soil is suited to all the crops commonly grown in the two counties. Surface drains are needed in some areas. (Management group I–2)

Darwin Series

The Darwin series consists of deep, very poorly drained, nearly level soils that formed in silty clay alluvium. These soils occur on bottom lands along the larger creeks and rivers throughout the survey area.

In a typical profile the surface layer is very dark gray silty clay about 19 inches thick. The next layer is dark-gray silty clay to clay about 19 inches thick. The next layer is mottled, gray silty clay about 17 inches thick. The underlying material to a depth of about 65 inches is mottled, gray silty clay.

Darwin soils are medium in organic-matter content and natural fertility. They have a moderate to high available water capacity and very slow permeability.

Representative profile of Darwin silty clay, NW10, NW40, SW160, sec. 26, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 5 inches, very dark gray (10YR 3/1) silty clay; strong, medium, granular structure; very firm; slightly acid; clear, smooth boundary.

A1—5 to 19 inches, very dark gray (10YR 3/1) silty clay to clay; few, fine, distinct mottles of olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6), and few,

fine, faint mottles of grayish brown (2.5Y 5/2); strong, fine, angular blocky structure; very firm; slightly acid; gradual, smooth boundary.

B21g—19 to 26 inches, dark-gray (2.5Y 4/0) silty clay to clay; few, fine, faint mottles of olive brown (2.5Y 4/4); strong, fine, prismatic structure that breaks to moderate, fine, angular blocky; very firm; films of dark-gray (5Y 4/1) clay on all ped surfaces; slightly acid; gradual, smooth boundary.

B22g—26 to 38 inches, dark-gray (5Y 4/1) silty clay to clay; few, fine, faint mottles of olive (5Y 5/4); strong, fine, prismatic structure that breaks to moderate, fine, angular blocky structure; very firm; films of dark-gray (2.5Y 4/0) clay on most ped surfaces; slightly acid; gradual, smooth boundary.

B3g—38 to 55 inches, gray (5Y 5/1) silty clay; common, fine, distinct mottles of light olive brown (2.5Y 5/6) and olive (5Y 5/6) and common, coarse, faint mottles of very dark gray (2.5Y 3/0); moderate, medium, angular blocky structure; firm; slightly acid; gradual, smooth boundary.

Cg—55 to 65 inches, gray (5Y 5/1) silty clay; many, fine, prominent mottles of brown (7.5YR 4/4) and strong brown (7.5YR 5/8); massive; firm; neutral.

In places the Ap horizon is heavy silty clay loam to clay. Where Darwin soils grade to Petrolia soils, the surface layer is lighter in color and somewhat less clayey than that described. The combined thickness of the Ap and A1 horizons ranges from 15 to 30 inches, but generally it is about 20 inches. Reaction of the B22g and B3g horizons ranges from slightly acid to mildly alkaline.

Darwin soils are darker colored and more clayey than Petrolia soils. Darwin soils have poorer natural drainage than Montgomery soils.

Darwin silty clay (0 to 2 percent slopes) (71).—Runoff is slow, and ponding occurs in many places. Included with this soil in mapping are small areas of silty clay loam soils.

Wetness, poor tilth, and floods are the major limitations to use of this soil. Tile drains are not effective because permeability is too slow, but a system of surface ditches can be installed. In places, floods limit the use of this soil to summer row crops. (Management group IIIw–2)

Ebbert Series

The Ebbert series consists of deep, poorly drained, nearly level soils in low-lying areas of the claypan prairies. The largest areas are in the northern part of Richland County. These soils formed in 30 to 55 inches of loess underlain by Illinoian glacial till.

In a typical profile the surface layer is very dark gray silt loam about 12 inches thick. The subsurface layer is silt loam about 6 inches thick. The upper part is dark gray and very dark gray, and the lower part is gray and mottled. The next layer is mottled silty clay loam about 30 inches thick. The upper 14 inches is dark gray, the next 6 inches is grayish brown, and the lower 10 inches is gray. The underlying material to a depth of about 80 inches is mottled, gray gritty silty clay loam.

Ebbert soils are medium in organic-matter content. These soils have a high available water capacity and slow permeability. They are low to medium in natural fertility.

Representative profile of Ebbert silt loam, NE40, NE160, sec. 35, T. 5 N., R. 9 E., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) silt loam; weak, fine, crumb structure; friable; strongly acid; abrupt, smooth boundary.

A1—7 to 12 inches, very dark gray (10YR 3/1) silt loam that has small spots of black (10YR 2/1); few, fine, distinct mottles of dark yellowish brown (10YR 4/4); moderate, fine, crumb structure; friable; strongly acid; clear, smooth boundary.

A21—12 to 15 inches, dark-gray (10YR 4/1) silt loam that has spots of very dark gray (10YR 3/1); common, fine, distinct mottles of dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6); weak, medium, platy structure that breaks to crumb; friable; strongly acid; clear, smooth boundary.

A22—15 to 18 inches, gray (10YR 5/1) silt loam that has spots of dark gray (10YR 4/1); common, fine, distinct mottles of dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6); weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

B1—18 to 22 inches, dark-gray (10YR 4/1) silty clay loam; common, fine, prominent mottles of strong brown (7.5YR 5/6); moderate, fine and medium, subangular blocky structure; firm; discontinuous coatings of gray (10YR 5/1) silt on ped surfaces; films of very dark gray (10YR 3/1) along root channels; very strongly acid; gradual, smooth boundary.

B21tg—22 to 32 inches, dark-gray (10YR 4/1) silty clay loam; many, fine, prominent mottles of strong brown (7.5YR 5/6 and 5/8) and common, fine, faint mottles of grayish brown (2.5Y 5/2); strong, fine and medium, prismatic structure that breaks to medium angular blocky; firm; nearly continuous films of very dark gray (10YR 2/1) clay on ped surfaces; films of black (10YR 2/1) clay along root channels; very strongly acid; gradual, smooth boundary.

B22tg—32 to 38 inches, grayish-brown (2.5Y 5/2) heavy silty clay loam; many, medium, prominent mottles of strong brown (7.5YR 5/6 and 5/8) and common, medium, faint mottles of gray (10YR 5/1); moderate, medium, angular blocky structure; firm; few, discontinuous films of very dark gray (10YR 3/1) clay on ped surfaces; films of black (10YR 2/1) clay along root channels; very strongly acid; gradual, smooth boundary.

B3g—38 to 48 inches, gray (10YR 5/1) silty clay loam; common, medium, prominent mottles of strong brown (7.5YR 5/6); weak, medium and coarse, subangular blocky structure; firm; few, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; films of very dark gray (10YR 3/1) clay along root channels; strongly acid; clear, smooth boundary.

IICb—48 to 80 inches, gray (2.5Y 5/0) gritty silty clay loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6 and 5/8); massive or weak, coarse, subangular blocky structure; firm; medium acid.

Where Ebbert soils grade to Newberry and Cisne soils, the Ap horizon is lighter colored than that described. The combined thickness of the Ap and A1 horizons is 10 to 16 inches. The Ap horizon is normally silt loam, but in large, low-lying areas it is light silty clay loam. Few to many crayfish holes filled with darker colored soil material are in this soil. Reaction of the B horizons ranges from medium to very strongly acid.

Ebbert soils have a thicker and darker surface layer than Newberry, Chauncey, and Cisne soils.

Ebbert silt loam (0 to 2 percent slopes) (48).—This nearly level soil is generally in the lowest part of depressions. Runoff is slow to ponded.

Where drained and fertilized, this soil is well suited to crops. Wetness and low fertility are the major limitations to use. Tile drains are not effective because permeability is too slow. Tilth is poor, but it can be improved by good management. (Management group IIw–1)

Grantsburg Series

The Grantsburg series consists of deep, moderately well drained, gently to moderately sloping soils that have a fragipan. These soils formed in 40 to 50 inches of loess and residual sandstone material. They occur on uplands in the southwestern part of Edwards County.

In a typical profile the surface layer is brown silt loam about 7 inches thick. The subsurface layer is yellowish-brown silt loam about 4 inches thick. The next layer is about 10 inches thick. It is yellowish-brown heavy silt loam in the upper part and dark yellowish-brown silty clay loam in the lower part. The next layer is about 29 inches thick. The upper 12 inches is yellowish-brown silty clay loam, and the lower 17 inches is mottled brown silt loam. The underlying material to a depth of about 60 inches is mottled yellowish-brown silt loam.

Grantsburg soils are low in organic-matter content and natural fertility. These soils are moderately permeable in the upper part and slowly permeable in the fragipan. They have moderate available water capacity. Plant roots are somewhat restricted by the compact fragipan.

Representative profile of Grantsburg silt loam, 2 to 4 percent slopes, SW10, SE40, SE160, sec. 27, T. 2 S., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; weak, medium, crumb structure; friable; slightly acid; clear, smooth boundary.

A2—7 to 11 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, platy structure; friable; medium acid; clear, smooth boundary.

B1—11 to 14 inches, yellowish-brown (10YR 5/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B2t—14 to 21 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, fine, subangular blocky structure; firm; very strongly acid; abrupt, smooth boundary.

A'2—21 to 25 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; firm; thick, continuous coatings of light-gray (10YR 7/1) silt on ped surfaces; very strongly acid; abrupt, smooth boundary.

B'x1—25 to 33 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/8); common streaks of light gray (10YR 6/1 and 7/2); very coarse, weak, prismatic structure that breaks to moderate, medium, subangular blocky; very firm and brittle; very strongly acid; gradual, wavy boundary.

B'x2—33 to 45 inches, brown (10YR 4/3) heavy silt loam; common, medium, faint mottles of grayish brown (10YR 5/2); massive to very weak, blocky structure; very firm and brittle; large polygonal blocks streaked with gray silt; very strongly acid; gradual, smooth boundary.

IIB'x3—45 to 50 inches, brown (10YR 4/3) heavy silt loam that grades to gritty silt loam; common, medium, faint mottles of grayish brown (10YR 5/2); massive to very weak, blocky structure; very firm and brittle; large polygonal blocks streaked with gray silt; very strongly acid; gradual, smooth boundary.

IICx—50 to 60 inches, yellowish-brown (10YR 5/4) gritty silt loam; common, medium, faint mottles of light gray (10YR 6/1) and few, medium, prominent mottles of dark yellowish brown (10YR 4/4); massive; firm; somewhat dense and brittle; extremely acid.

Some wooded soils have a thinner, darker surface layer than is typical. The Ap horizon is normally silt loam, but in some eroded soils it consists partly or entirely of subsoil material. Depth to the A'2 horizon is 18 to 26 inches, and depth to the fragipan is 22 to 30 inches. Iron and manganese concretions are few to many in all horizons.

Grantsburg soils are associated with the Robbs, Zanesville, and Wellston soils. Grantsburg soils have better natural drainage than Robbs soils. Grantsburg soils formed in deeper loess than Zanesville and Wellston soils and have a more highly developed fragipan than Zanesville soils. In Grantsburg soils the solum formed partly in loess and partly in residual sandstone material, but the solum of Hosmer soils formed entirely in loess and that of Ava soils formed partly in loess and partly in glacial till.

Grantsburg silt loam, 2 to 4 percent slopes (301B).—This soil has the profile described as typical for the series. Runoff is medium. Included in mapping are small areas where this soil is eroded and small areas where it is nearly level.

This soil is suited to corn, soybeans, wheat, hay, and meadow. Some areas are used for permanent pasture, and a few areas are wooded. Erosion and low fertility are the major limitations to use. (Management group IIe–2)

Grantsburg silt loam, 4 to 7 percent slopes (301C).—This soil is similar to Grantsburg silt loam, 2 to 4 percent slopes, but it is more strongly sloping. Runoff is medium.

Where fertilized and protected from erosion, this soil is suited to all the crops commonly grown in the two counties. It is well suited to permanent pasture. Erosion and low fertility are the main limitations to use. (Management group IIIe–3)

Grantsburg silt loam, 4 to 7 percent slopes, eroded (301C2).—This soil has lost part of the original surface and subsurface layers through erosion. In places the plow layer consists partly of subsoil material. Runoff is medium to rapid. Included with this soil in mapping are small areas where this soil is severely eroded.

This soil is suited to all the crops commonly grown in the two counties. Drought is a hazard where corn and soybeans are grown. This soil is well suited to pasture. Where well managed, pine trees grow well. Erosion, low fertility, and, in places, poor tilth are the main limitations to use. (Management group IIIe–3)

Hickory Series

The Hickory series consists of deep, moderately well drained and well drained soils that formed in glacial till. These soils are strongly sloping to steep, and they occur on uplands throughout the two counties. They commonly occupy steep bluffs where the upland slopes to bottom land.

In a typical profile the surface layer is brown loam about 6 inches thick. The next layer is clay loam about 54 inches thick; the upper 14 inches is yellowish brown; the next 8 inches is strong brown and mottled; the next 5 inches is yellowish brown; the next 12 inches is strong brown and mottled; and the lower 15 inches is brown to yellowish brown and mottled. The underlying material to a depth of about 70 inches is brown, yellowish-brown, and light brownish-gray gravelly clay loam.

Hickory soils are very low in organic-matter content and natural fertility. They are moderately permeable and have a high available water capacity. Slopes are commonly short.

Representative profile of Hickory loam, 7 to 12 percent slopes, eroded, in SW2½, SE10, SW40, NE160, sec. 17, T. 1 N., R. 10 E., in a wooded area:

A1—0 to 2 inches, very dark brown (10YR 2/2) loam; strong, fine crumb structure; friable; medium acid; abrupt, smooth boundary.

A2—2 to 6 inches, brown to yellowish-brown (10YR 5/3 and 5/4) loam; moderate, fine, crumb structure; friable; very strongly acid; clear, smooth boundary.

B1—6 to 13 inches, yellowish-brown (10YR 5/6) clay loam; moderate, fine, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—13 to 20 inches, yellowish-brown (10YR 5/6 and 5/8) clay loam; moderate, fine and medium, subangular blocky structure; firm; few, discontinuous films of dark yellowish-brown (10YR 4/4) clay on ped surfaces; very strongly acid; gradual, smooth boundary.

B22t—20 to 28 inches, strong-brown (7.5YR 5/6) heavy clay loam; common, medium, distinct mottles of yellowish red (5YR 4/6) and few, fine, distinct mottles of light yellowish brown (10YR 6/4); strong, fine, subangular blocky structure; firm; common, discontinuous films of dark-brown (7.5YR 4/4) clay on ped surfaces; very strongly acid; gradual, smooth boundary.

B23t—28 to 33 inches, yellowish-brown (10YR 5/4 and 5/6) clay loam; few, fine, prominent mottles of yellowish red (5YR 4/6) and few, fine, faint mottles of grayish brown (10YR 5/2); moderate, fine, subangular blocky structure; firm; few, discontinuous films of dark yellowish-brown (10YR 4/4) clay on ped surfaces; very strongly acid; gradual, smooth boundary.

B31—33 to 45 inches, strong-brown (7.5YR 5/6) clay loam; common, fine and medium, distinct mottles of grayish brown (10YR 5/2); weak, coarse, subangular blocky structure; firm; few, discontinuous films of dark-brown (10YR 3/3) clay on ped surfaces; large black (10YR 2/1) iron and manganese stains on ped surfaces; very strongly acid; gradual, smooth boundary.

B32—45 to 60 inches, brown to yellowish-brown (10YR 5/3 and 5/6) gravelly clay loam; common, fine, faint mottles of light brownish gray (10YR 6/2); weak, coarse, subangular blocky structure; hard when dry, firm when moist; common, very dark brown (10YR 2/2) iron and manganese stains on ped surfaces; medium acid; gradual, smooth boundary.

C—60 to 70 inches, brown (10YR 5/3), yellowish-brown (10YR 5/6), and light brownish-gray (10YR 6/2) gravelly clay loam to gravelly loam; massive; hard when dry; medium acid.

The plow layer is commonly mixed with lighter colored layers. In many places, the A1 and A2 horizons are eroded away. Reaction of the B horizons ranges from slightly acid to very strongly acid. The content of gravel in the C horizon ranges from low to very high. In places, residual shale and sandstone material is mixed with the glacial till to a depth of 60 inches. Iron and manganese concretions generally are few to common in all horizons.

Hickory soils developed in glacial till and contain more sand than Alford, Ava, or Hosmer soils. Unlike Ava and Hosmer soils, Hickory soils lack a fragipan. Hickory soils have better natural drainage than Blair soils and are not so sandy as Alvin soils.

Hickory loam, 7 to 12 percent slopes, eroded (8D2).—This soil has the profile described as typical for the series. Included in mapping are small areas where slopes are 4 to 7 percent and small areas where this soil is only slightly eroded.

This soil is suited to small grains, hay, and pasture. Corn and soybeans can be grown occasionally. New pine plantings grow well if properly managed. Erosion and low fertility are the main limitations to use of this soil. Terracing and contour plowing are not practical, because slopes are short and irregular. (Management group IIIe–2)

Hickory loam, 12 to 18 percent slopes, eroded (8E2).—This soil has rapid runoff. This soil is similar to Hickory loam, 7 to 12 percent slopes, eroded, but it has stronger slopes. Included in mapping are small areas where this soil is only slightly eroded and areas where this soil contains more loess than is typical.

Where cleared and fertilized, this soil is well suited to pasture. New pine plantings grow well if properly managed. Wooded areas can be managed for timber. Erosion and low fertility are the main limitations to use of this soil. Terracing and stripcropping are not generally practical, because slopes are short and irregular. (Management group IVe–2)

Hickory loam, 18 to 30 percent slopes, eroded (8F2).—This soil is similar to Hickory loam, 7 to 12 percent slopes, eroded, but it has stronger slopes. Runoff is rapid. Included in mapping are small areas where this soil is only slightly eroded.

This soil is suited mainly to trees. Erosion, low fertility, and steep slopes are the major limitations to use. Equipment is difficult to use on the steep soils. Pine trees can be planted in some areas. Where farm machinery can be used, this soil can be cleared and used for pasture. (Management group VIe–1)

Hickory soils, 7 to 12 percent slopes, severely eroded (8D3).—Erosion has removed the original surface and subsurface layers of these soils. The surface layer ranges from loam to clay loam in texture. Runoff is rapid.

These soils are suited to hay and pasture. Small grains can be grown occasionally. New pine plantings grow well if they are managed properly. Erosion, low fertility, and poor tilth are the main limitations to use. Terracing and stripcropping generally are not practical on these soils. (Management group IVe–2)

Hickory soils, 12 to 30 percent slopes, severely eroded (8E3).—The surface layer of these soils is made up of yellowish-brown subsoil material that ranges from loam to clay loam in texture. Runoff is rapid. Included with these soils in mapping are a few small gullies and small areas of eroded Blair soils that have 12 to 18 percent slopes.

These soils are well suited to pasture. Less sloping areas are also suited to hay and an occasional small grain. Adapted pines grow well if they are properly managed. Erosion, low fertility, and poor tilth are the main limitations to use of these soils. (Management group VIe–1)

Hosmer Series

The Hosmer series consists of deep, moderately well drained, gently sloping to moderately steep soils that have a fragipan. These soils are on ridgetops, on the sides of drainageways, and on rounded hills in the southeastern part of Edwards County. They formed in 50 to 85 inches of loess underlain by Illinoian glacial till or residual sandstone material.

In a typical profile the surface layer is brown silt loam about 6 inches thick. The subsurface layer is yellowish-brown silt loam about 4 inches thick. The next layer is

brown silty clay loam about 16 inches thick. The next layer is about 31 inches thick. In sequence from the top, the upper 12 inches is mottled, dark-brown and yellowish-brown silty clay loam; the next 6 inches is mottled, dark yellowish-brown silt loam; and the lower 13 inches is mottled, brown silt loam. The underlying material to a depth of about 68 inches is mottled, yellowish-brown silt loam.

Hosmer soils are low in organic-matter content and low to medium in natural fertility. These soils are moderately permeable in the upper part, but they are slowly permeable in the fragipan. The available water capacity is moderate. Plant roots are somewhat restricted by the fragipan, especially in eroded soils.

Representative profile of Hosmer silt loam, 2 to 4 percent slopes, NE10, NW40, NW160, sec. 12, T., 3 S., R. 10 E., in a cultivated field:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, crumb structure; friable; slightly acid; clear, smooth boundary.

A2—6 to 10 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, platy structure; friable; medium acid; clear, smooth boundary.

B1—10 to 15 inches, brown (7.5YR 5/4) light silty clay loam; moderate, fine, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

B2t—15 to 26 inches, brown (7.5YR 5/4) light silty clay loam; moderate to strong, medium, subangular blocky structure; firm; thin, discontinuous films of dark-brown (7.5YR 4/4) clay on ped surfaces; strongly acid; abrupt, smooth boundary.

A'2—26 to 29 inches, dark-brown (7.5YR 4/4) light silty clay loam; moderate to strong, medium, subangular blocky structure; firm; thick coatings of very pale brown (10YR 7/3) silt on ped surfaces; very strongly acid; clear, wavy boundary.

B'2t—29 to 38 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct mottles of very pale brown (10YR 7/3); strong to moderate, medium, subangular blocky structure; firm; many, continuous films of dark-brown (7.5YR 4/4) clay on ped surfaces; strongly acid; gradual, smooth boundary.

B'x1—38 to 44 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; common, medium, distinct mottles of pale brown (10YR 6/3) and common, fine, distinct mottles of yellowish brown (10YR 5/8); weak, medium to coarse, subangular blocky structure; very firm; thin, discontinuous films of dark-brown (7.5YR 4/4) clay on ped surfaces; areas of polygonal structure streaked with gray silt; very strongly acid; gradual, smooth boundary.

B'2—44 to 57 inches, brown (10YR 5/3) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/8) and light gray (10YR 7/2); massive; very firm; large polygonal blocks streaked with gray silt; thin, discontinuous films of dark-brown (7.5YR 4/4) clay along some cleavage planes; very strongly acid; gradual, smooth boundary.

C—57 to 68 inches, yellowish-brown (10YR 5'4) silt loam; common, coarse, distinct mottles of light gray (10YR 7/2); massive; strongly acid.

Wooded soils have a thin, dark A1 horizon. The Ap horizon is generally silt loam, but in eroded soils it consists partly or entirely of subsoil material. Depth to the A'2 horizon is 24 to 30 inches, and depth to the fragipan is 24 to 40 inches. Iron and manganese concretions generally are few to many in all horizons.

Hosmer soils are associated with somewhat poorly drained Stoy soils. Hosmer soils formed entirely in loess, whereas the solum of Ava soils formed partly in loess and partly in glacial till and the solum of Grantsburg soils formed partly in loess and partly in sandstone residuum. Hosmer soils have a less strongly developed fragipan than Grantsburg soils.

Hosmer silt loam, 2 to 4 percent slopes (214B).—This soil has the profile described as typical for the series. Runoff is medium. Included in mapping are small areas where this soil is nearly level and small areas where this soil is eroded.

This soil is used mostly for corn, soybeans, wheat, hay, and meadow. Some areas are in permanent pasture, and a few areas are wooded. Erosion and low fertility are the main limitations to use. Where terraced and plowed on the contour, this soil can be cultivated intensively. (Management group IIe-2)

Hosmer silt loam, 4 to 7 percent slopes, eroded (214C2).—This soil has lost some of the original surface and subsurface layers through erosion. In places the plow layer consists of subsoil material. Runoff is medium. Included in mapping are small areas where this soil is not eroded.

Where fertilized and protected from erosion, this soil is suited to all the crops commonly grown in the two counties. It is well suited to pasture or trees. The major limitations to use of this soil are erosion, low fertility, and, in places, poor tilth. (Management group IIIe-3)

Hosmer silt loam, 7 to 12 percent slopes, eroded (214D2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. In places the plow layer consists partly of subsoil material. Runoff is medium to rapid. Included in mapping are small areas where this soil is only slightly eroded.

This soil is suited to pasture or trees. Erosion and low fertility are the main limitations to use. Cultivated crops can be grown where erosion is controlled by contour plowing, terracing, and stripcropping and a complete fertilizer is used. (Management group IIIe-3)

Hosmer silt loam, 12 to 18 percent slopes, eroded (214E2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. Runoff is rapid. Included in mapping are small areas where this soil is only slightly eroded and areas where this soil is severely eroded.

Where contour stripcropped, this soil is suited to row crops. Most cleared areas are better suited to permanent pasture. A small grain can be grown occasionally. Erosion and low fertility are the major limitations to use. Adapted pines grow well if managed properly. Wooded soil can be managed for timber and should be protected from fire and overgrazing. (Management group IVe-3)

Hosmer soils, 7 to 12 percent slopes, severely eroded (214D3).—These soils have lost most or all of the original surface and subsurface layers by erosion. The surface layer consists of yellowish-brown subsoil material. It ranges from silt loam to silty clay loam in texture. Runoff is rapid. Included with this soil in mapping are a few small gullies.

These soils are suited to permanent pasture or hay. A small grain can be grown occasionally. Erosion, low fertility, and poor tilth are the main limitations to use. Pine plantings need careful management. (Management group IVe-3)

Hoyleton Series

The Hoyleton series consists of deep, somewhat poorly drained soils that are nearly level to moderately sloping. These soils are on uplands of the claypan prairies. They formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is dark-brown silt loam about 9 inches thick. The subsurface layer is mottled brown silt loam about 5 inches thick. The next layer is silty clay loam about 41 inches thick. It is grayish-brown mottled with red in the upper 8 inches; the lower 33 inches is grayish-brown mottled with yellowish brown. The underlying material, to a depth of about 72 inches, is light brownish-gray silty clay loam mottled with gray.

Hoyleton soils are low in organic-matter content and natural fertility. They have high available water capacity and slow permeability.

Representative profile of Hoyleton silt loam, 2 to 4 percent slopes, in SW2½, SW10, SE40, NW 160, sec. 32, T. 2 N., R. 10 E., in a cultivated field:

Ap—0 to 6 inches, dark-brown (10YR 3/3) silt loam; strong, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—6 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A2—9 to 14 inches, brown (10YR 5/3) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/8) and few, fine, faint mottles of light brownish gray (10YR 6/2); moderate, fine, crumb structure; friable; small splotches of dark brown (10YR 3/3); very dark grayish-brown (10YR 3/2) worm casts; strongly acid; clear, smooth boundary.

B1—14 to 17 inches, brown (10YR 5/3) silty clay loam; many, fine, prominent mottles of red (2.5YR 4/8) and common, fine, faint mottles of grayish brown (10YR 5/2); moderate, fine, subangular blocky structure; firm; few, discontinuous films of very dark grayish-brown (10YR 3/2) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B21t—17 to 22 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium and coarse, prominent mottles of red (2.5YR 4/8) and common, medium, prominent mottles of red (2.5YR 5/8); strong, fine, prismatic structure that breaks to moderate, fine, subangular blocky; firm; many, nearly continuous films of dark-gray (10YR 4/1) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B22t—22 to 27 inches, grayish-brown (10YR 5/2) heavy silty clay loam; many, medium, distinct mottles of strong brown (7.5YR 5/6), and few, medium, distinct mottles of dark yellowish brown (10YR 4/4); moderate, medium, subangular blocky structure; firm; few, discontinuous films of dark-gray (10YR 4/1) and very dark gray (10YR 3/1) clay on ped surfaces; strongly acid; gradual, smooth boundary.

B31—27 to 32 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; firm; few, discontinuous films of dark-gray (10YR 4/1) clay on ped surfaces; strongly acid; clear, smooth boundary.

IIB32—32 to 55 inches, light silty clay loam that has colors of very dark grayish brown (10YR 3/2), dark brown (10YR 3/3), and dark yellowish brown (10YR 4/4); weak, coarse, subangular blocky structure; firm; small till pebbles; medium acid; gradual, smooth boundary.

IIC—55 to 72 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, coarse, faint mottles of gray (2.5Y 5/0) and many, fine, distinct mottles of yellowish brown (10YR 5/4); massive; firm; small till pebbles; medium acid.

In eroded areas, the Ap horizon contains some subsoil material and may be lighter colored than in the typical profile. In places the red mottles in the material from the B1 and B21t horizons give the Ap horizon a reddish color. Few to many iron and manganese concretions are in all horizons.

Hoyleton soils have a darker surface layer or plow layer than Bluford and Stoy soils. The combined thickness of the surface and subsurface layers of Hoyleton soils is less than 24 inches, but that of Lukin soils is more than 24 inches. Hoyleton soils have a darker surface layer than Tamalco soils and less exchangeable sodium in the subsoil.

Hoyleton silt loam, 0 to 2 percent slopes (3A).—The surface layer of this soil is thicker than that in the profile described as typical for the series. Runoff is slow, and erosion is a slight hazard. Included with this soil in mapping are small spots of Huey soils, mostly in Richland County.

This soil is suited to cultivated crops. The major limitations to use are wetness and low fertility. Where adequately drained and fertilized, this soil has good tilth and can be intensively cultivated. Diversion terraces are needed in places to intercept runoff from higher areas. (Management group IIw–2)

Hoyleton silt loam, 2 to 4 percent slopes (3B).—This soil has the profile described as typical for the series. Runoff is medium.

This soil is suited to cultivated crops. The hazard of erosion and low fertility are the main limitations to use of this soil. Surface drainage is needed in some areas. (Management group IIe–3)

Hoyleton silt loam, 2 to 4 percent slopes, eroded (3B2).—This soil has a thinner surface layer than that in the profile described as typical for the series. Runoff is medium. The plow layer is lighter colored where it has been mixed with material of the subsurface layer or the subsoil. Where red mottles in the upper part of the subsoil have been mixed into the plow layer, the surface is reddish in color. Included with this soil in mapping are small areas of severely eroded Hoyleton soils.

This soil is suited to all crops commonly grown in the two counties. Where corn, soybeans, and other summer annuals are grown on this soil, insufficient moisture may affect crop growth sooner than on less eroded soils. Erosion is the major hazard, and wetness also is a hazard in places. Management is needed to improve fertility and control erosion. Suitable practices are sodding waterways, utilizing crop residues, and applying a complete fertilizer and manure. (Management group IIIe–1)

Hoyleton silt loam, 4 to 7 percent slopes, eroded (3C2).—This soil has a thinner surface layer than that in the profile described as typical for the series. In most places the plow layer contains material from the upper part of the subsoil. It has a reddish color and is somewhat sticky when wet. Runoff is medium in most areas.

Included with this soil in mapping are small areas of severely eroded Hoyleton soils. In these severely eroded areas, the plow layer consists mostly of subsoil material and runoff is rapid. Also included are small areas of uneroded Hoyleton soils.

This soil is suitable for crops if erosion is controlled. (Management group IVe–1)

Huey Series

The Huey series consists of deep, poorly drained and somewhat poorly drained, nearly level to moderately sloping soils. The nearly level to gently sloping soils are in small areas scattered throughout the prairies, and the gently sloping to moderately sloping soils are mostly on the sides and at the head of drainageways. Huey soils formed in loess and glacial till that have a high content of exchangeable sodium.

In a typical profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is silt loam about 5 inches thick. The upper part is grayish brown, and the lower part is light brownish gray and is mottled. The next layer is mottled, grayish-brown silty clay loam about 23 inches thick. This layer is moderately alkaline. The underlying material to a depth of about 60 inches is mottled, gray, gritty silty clay loam.

Huey soils are low in organic-matter content and natural fertility. Crops on these soils do not respond well to fertilizers. Huey soils are very slowly permeable and have low available water capacity. These soils have poor physical characteristics because the sodium content is high.

Representative profile of Huey silt loam, 0 to 2 percent slopes, SW2½, NW10, NW40, SW160, sec. 29, T. 3 N., R. 9 E., in a cultivated field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A21—6 to 9 inches, grayish-brown (10YR 5/2) silt loam that has common, small spots of dark grayish brown (10YR 4/2); weak, thin, platy structure; friable; very strongly acid; clear, smooth boundary.

A22—9 to 11 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, distinct mottles of strong brown (7.5YR 5/6) and common, fine, faint mottles of grayish brown (10YR 5/2); weak, thin, platy structure; friable; strongly acid; abrupt, smooth boundary.

B21t—11 to 17 inches, grayish-brown (10YR 5/2) silty clay loam; many, fine, faint mottles of brown (10YR 4/3) and common, fine, distinct mottles of yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4); weak, medium, subangular blocky structure; very firm; mildly alkaline; clear, smooth boundary.

B22t—17 to 21 inches, grayish-brown (10YR 5/2) heavy silty clay loam; many, fine, distinct mottles of yellowish brown (10YR 5/6 and 5/8); weak, medium, subangular blocky structure; very firm; common, discontinuous coatings of light-gray (10YR 7/1) silt on ped surfaces; moderately alkaline; clear, smooth boundary.

B23t—21 to 28 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/4 and 5/8) and few, fine, distinct mottles of strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; very firm; moderately alkaline; gradual, smooth boundary.

IIB3t—28 to 34 inches, grayish-brown (2.5Y 5/2) gritty silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6 and 5/8); weak, medium and coarse, subangular blocky structure; very firm; moderately alkaline; gradual, wavy boundary.

IIC1—34 to 47 inches, gray (10YR 5/1) and strong-brown (7.5YR 5/6 and 5/8) gritty silty clay loam; common, medium, distinct mottles of yellowish red (5YR 4/6); weak, coarse, subangular blocky structure; firm; moderately alkaline; gradual, wavy boundary.

IIC2—47 to 60 inches, gray (10YR 5/1 and 6/1) gritty silty clay loam to clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6 and 5/8); massive; firm; moderately alkaline.

In places the Ap horizon is darker and deeper than described. In eroded soils the Ap horizon consists partly or entirely of subsoil material. Reaction of the Ap horizon ranges from mildly alkaline to very strongly acid. Reaction of the B1 and C horizons ranges from mildly to strongly alkaline. Iron and manganese stains and concretions are few to many in all horizons.

Huey soils contain more exchangeable sodium than Cisne soils and have a lighter colored surface layer. Huey soils are more poorly drained than Tamalco soils, which have a subsoil that is acid in the upper part.

Huey silt loam, 0 to 2 percent slopes (120A).—This soil has the profile described as typical for the series. Runoff is slow to medium. Included with this soil in mapping are small areas of Tamalco soils.

Most of this soil is cultivated because it occurs within larger areas of tillable soils. This soil is not so well suited to corn and soybeans as it is to wheat. Poor tilth, low fertility, wetness in spring, and droughtiness are the main limitations to use. Erosion is a hazard where slopes are more than 1 percent. (Management group IVw–1)

Huey silt loam, 2 to 4 percent slopes, eroded (120B2).—This soil has lost most of the original surface and subsurface layers by erosion, and in places the plow layer contains subsoil material. Runoff is rapid. Included in mapping are small areas where this soil is only slightly eroded.

This soil is suited to small grains, forage grasses, and legumes. Its use is limited by erosion, wetness in spring, poor tilth, droughtiness in summer, and low fertility. Where highly alkaline subsoil material is mixed into the plow layer, seedbeds are difficult to prepare (fig. 8). (Management group IVw–1)

Huey soils, 2 to 7 percent slopes, severely eroded (120C3).—These soils have lost the original surface and subsurface layers through erosion. The plow layer consists of highly alkaline subsoil material. The surface layer ranges from silt loam to silty clay loam in texture. Runoff is rapid.

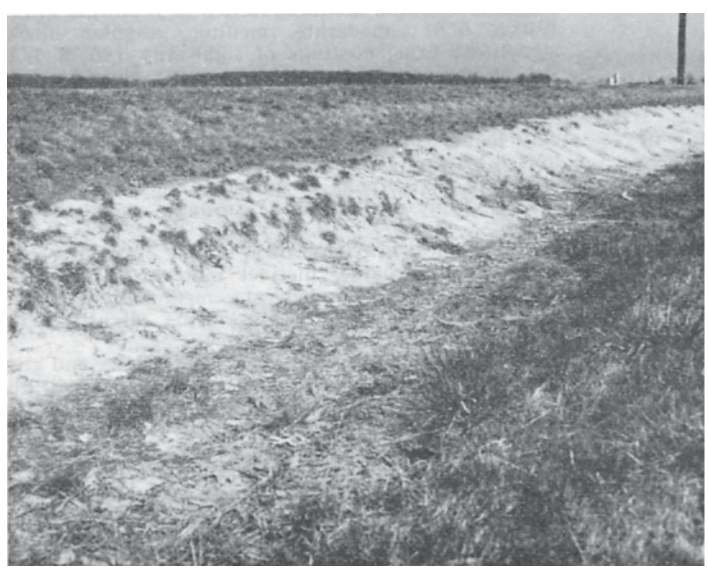

Figure 8.—**Huey silt loam, 2 to 4 percent slopes, eroded. A shallow ditch exposes the light-colored, alkaline subsoil.**

These soils are suited to grasses and legumes. A small grain can be grown occasionally. The main limitations to use are erosion, low fertility, droughtiness, and poor tilth. Wetness is a hazard in spring. Vegetation is difficult to establish in most areas. (Management group VIe–3)

Lukin Series

The Lukin series consists of deep, somewhat poorly drained, nearly level soils that formed in loess and silty material washed from uplands. These soils occur at the base of steep slopes, mostly in the southern part of Edwards County.

In a typical profile the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsurface layer is brown silt loam about 14 inches thick. The next layer is about 34 inches thick. In sequence from the top, the upper 14 inches is mottled, pale-brown and light brownish-gray silty clay loam; the next 12 inches is mottled, grayish-brown silty clay loam; and the lower 8 inches is mottled, light brownish-gray and gray heavy silt loam. The underlying material to a depth of about 65 inches is mottled, light brownish-gray to gray silt loam.

Lukin soils are low to medium in organic-matter content and natural fertility. They are slowly permeable and have a high available water capacity.

Representative profile of Lukin silt loam, SW10, SE40, SE160, sec. 28, T. 2 S., R. 10 E., in a cultivated field:

A1—0 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A21—12 to 18 inches, brown (10YR 5/3) silt loam; weak, thick, platy structure that breaks to moderate, medium, granular; friable; medium acid; gradual, smooth boundary.

A22—18 to 26 inches, brown (10YR 5/3) silt loam; few, fine, faint mottles of yellowish brown (10YR 5/4); weak, thick, platy structure that breaks to moderate, medium, granular; friable; strongly acid; clear, smooth boundary.

B1—26 to 29 inches, pale-brown (10YR 6/3) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, angular blocky structure; firm; coatings of light-gray (10YR 7/1) silt on ped surfaces; strongly acid; clear, smooth boundary.

B21t—29 to 40 inches, light brownish-gray (10YR 6/2) silty clay loam; common, coarse, distinct mottles of yellowish brown (10YR 5/8); weak, medium, prismatic structure that breaks to moderate, medium, angular blocky; firm; medium acid; gradual, smooth boundary.

B22t—40 to 52 inches, grayish-brown (10YR 5/2) silty clay loam; many, coarse, distinct mottles of yellowish brown (10YR 5/8); moderate, medium and coarse, subangular blocky structure; firm; slightly acid; gradual, smooth boundary.

B3—52 to 60 inches, light brownish-gray (10YR 6/2) and gray (10YR 6/1) heavy silt loam; common, coarse, distinct mottles of yellowish brown (10YR 5/8); weak, coarse, subangular blocky structure; friable; slightly acid; gradual, smooth boundary.

C—60 to 65 inches, light brownish-gray (10YR 6/2) and gray (10YR 6/1) heavy silt loam; common, distinct mottles of yellowish brown (10YR 5/8); massive; friable; slightly acid; gradual, smooth boundary.

The A1 horizon is 10 to 16 inches thick. The combined thickness of the A horizons is 24 to 36 inches. Iron and manganese concretions are few to common in all horizons.

Lukin soils have a thicker surface layer than Hoyleton soils, and the depth to the subsoil is greater. Lukin soils have a darker, thicker surface layer than Bluford, Stoy, and Robbs soils. Lukin soils are mapped in association with poorly drained Chauncey soils.

Lukin silt loam (0 to 2 percent slopes) (167).—This soil has slow runoff. Included in mapping are a few areas where slopes are 4 percent.

This soil is suited to crops. Diversion terraces are needed in places to control runoff from higher areas. (Management group IIw–2)

Marissa Series

The Marissa series consists of deep, somewhat poorly drained, nearly level soils that are on stream terraces. These soils occur only in Edwards County and are mostly in the southern part. They formed in Wisconsin-age glacial sediments.

In a typical profile the surface layer is very dark gray silt loam about 12 inches thick. The subsurface layer is dark-gray silt loam about 4 inches thick. The next layer is mottled silty clay loam about 29 inches thick. The upper 11 inches is dark gray and dark grayish brown, and the lower 18 inches is light olive brown. The underlying material to a depth of about 72 inches is stratified, light brownish-gray silty clay loam, grayish-brown silty clay loam, light brownish-gray silt loam, and yellowish-brown loose sand.

Marissa soils are medium in organic-matter content and medium to high in natural fertility. These soils are moderate to moderately slow in permeability. Available water capacity is high. Tile drains can be used in these soils where outlets are available.

Representative profile of Marissa silt loam, SE2½, SW10, NW40, NE160, sec. 4, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) silt loam; strong, fine, crumb structure; friable; neutral; abrupt, smooth boundary.

A1—7 to 12 inches, very dark gray (10YR 3/1) silt loam; common, fine, faint mottles of dark yellowish brown (10YR 4/4); moderate, fine, crumb structure; friable; neutral; clear, smooth boundary.

A2—12 to 16 inches, dark-gray (10YR 4/1) silt loam; common, fine, distinct mottles of dark yellowish brown (10YR 4/4); moderate, fine, crumb structure; friable; slightly acid; clear, smooth boundary.

B1—16 to 19 inches, dark-gray (10YR 4/1) silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/4 and 5/6); moderate, fine, angular blocky structure; firm; few, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; slightly acid; clear, smooth boundary.

B21tg—19 to 27 inches, dark grayish-brown (2.5Y 4/2) silty clay loam; many, fine, distinct mottles of light olive brown (2.5Y 5/6); strong, fine, prismatic structure that breaks to moderate, fine, angular blocky; firm; continuous, shiny films of very dark grayish-brown (2.5Y 3/2) and black (2.5Y 2/0) clay on ped surfaces; slightly acid; gradual, smooth boundary.

B22t—27 to 35 inches, light olive-brown (2.5Y 5/4) silty clay loam; few, fine, faint mottles of grayish-brown (2.5Y 5/2); strong, fine, prismatic structure that breaks to moderate, fine, angular blocky; firm; nearly continuous, shiny films of dark grayish-brown (2.5Y 4/2) and very dark grayish-brown (2.5Y 3/2) clay on ped surfaces; slightly acid; gradual, smooth boundary.

B3t—35 to 45 inches, light olive-brown (2.5Y 5/4 and 5/6) silty clay loam; common, medium, faint mottles of grayish brown (2.5Y 5/2); moderate, fine and medium, angular blocky structure; firm; discontinuous films of dark grayish-brown (2.5Y 4/2) clay on ped surfaces; films of very dark grayish-brown (2.5Y 3/2) clay along root channels; neutral; abrupt, wavy boundary.

C1gca—45 to 51 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, medium, faint mottles of light olive brown (2.5Y 5/6) and dark gray (2.5Y 4/0); moderate, medium, subangular blocky structure; firm; many, irregularly shaped, white (2.5Y 8/2) concretions of calcium carbonate; strongly alkaline; clear, wavy boundary.

C2g—51 to 60 inches, grayish-brown (2.5Y 5/2) gritty silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; firm; films of very dark gray (10YR 3/1) clay along root channels; moderately alkaline; clear, smooth boundary.

C3g—60 to 67 inches, light brownish-gray (2.5Y 6/2) silt loam; common, fine, distinct mottles of yellowish brown (10YR 5/6 and 5/8) and few, fine, faint mottles of light gray (10YR 7/1); massive; friable; films of very dark gray (10YR 3/1) clay along root channels; moderately alkaline; clear, smooth boundary.

IIC4—67 to 72 inches, yellowish-brown (10YR 5/6) loose sand; single grain; mildly alkaline.

The combined thickness of the Ap and A1 horizons ranges from 10 to 16 inches. The Ap horizon generally is silt loam, but ranges from loam to light silty clay loam. The A1 horizon ranges from very dark grayish-brown (10YR 3/2) to black (N 2/0). Both the depth of the solum and the depth to free carbonates are generally 40 to 50 inches. Reaction ranges from slightly acid to mildly alkaline in the B horizons, and from mildly alkaline to strongly alkaline in the C horizons. The C horizons range from silty clay loam to sandy loam, and generally are sandy at a depth of 70 inches. The C horizons generally have few to many calcium concretions.

Marissa soils are darker colored than Reesville and McGary soils. Marissa soils contain less clay in the subsoil and substrata than McGary soils. Marissa soils are not so clayey or so poorly drained as Patton soils.

Marissa silt loam (0 to 2 percent slopes) (176).—Runoff is slow. Included in mapping are small areas on slight rises and at the upper end of drainageways where this soil is gently sloping. Also included are small areas of Patton silty clay loam.

This soil is suited to crops. Drains may be needed. Erosion is a slight hazard. (Management group I–2)

McGary Series

The McGary series consists of deep, somewhat poorly drained, nearly level to strongly sloping soils that formed in Wisconsin-age sediments. These soils occur on stream terraces and are only in Edwards County.

In a typical profile the surface layer is silt loam about 12 inches thick. It is dark grayish brown in the upper part and light brownish gray in the lower part. The next layer is about 28 inches thick. In sequence from the top, the upper 4 inches is mottled, grayish-brown silty clay loam, the next 5 inches is mottled, grayish-brown silty clay, the next 12 inches is mottled, light olive-brown silty clay, and the lower 7 inches is mottled, olive-gray silty clay. The underlying material to a depth of about 72 inches is mottled, gray silty clay.

McGary soils are low in organic-matter content and natural fertility. Crops on these soils have a limited response to fertilizers. McGary soils are very slowly permeable and have moderate available water capacity.

Representative profile of McGary silt loam, 0 to 2 percent slopes, sec. 33, T. 1 S., R. 14 W., about 75 feet north of Illinois Route 15, in a cultivated field:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—5 to 9 inches, grayish-brown (10YR 5/2) silt loam; weak, medium, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—9 to 12 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/4); weak, thick, platy structure; friable; medium acid; clear, smooth boundary.

B1—12 to 16 inches, grayish-brown (10YR 5/2) silty clay loam; many, fine, faint mottles of yellowish brown (10YR 5/6); moderate, fine and medium, subangular blocky structure; firm; slightly acid; clear, smooth boundary.

B21tg—16 to 21 inches, grayish-brown (2.5Y 5/2) silty clay; many, fine, faint mottles of light olive brown (2.5Y 5/6); moderate, fine, subangular blocky structure; very firm; many, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; slightly acid; gradual, smooth boundary.

B22tg—21 to 33 inches, light olive-brown (2.5Y 5/4) silty clay; many, fine, faint mottles of grayish brown (2.5Y 5/2); strong, fine, angular blocky structure; very firm; many, nearly continuous films of dark grayish-brown (2.5Y 4/2) clay on ped surfaces; slightly acid; gradual, smooth boundary.

B3g—33 to 40 inches, olive-gray (5Y 5/2) silty clay; many, fine, prominent mottles of yellowish brown (10YR 5/6); moderate, fine, angular blocky structure; very firm; common, discontinuous films of dark grayish-brown (2.5Y 4/2) clay on ped surfaces; mildly alkaline; clear, smooth boundary.

Cg—40 to 72 inches, gray (5Y 5/1) silty clay; many, medium and coarse, prominent mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; very firm; few to many, irregularly shaped calcium concretions; calcareous; moderately alkaline.

The Ap horizon is normally silt loam; in eroded soils it consists partly or entirely of very clayey subsoil material. Both the depth of the solum and the depth to free carbonates are generally 35 to 45 inches in uneroded soils. The Cg horizon ranges from silty clay to clay in texture. Calcium concretions generally are few to many in the C horizon.

McGary soils have more clay in the subsoil and substratum than Reesville and Marissa soils. McGary soils have a lighter colored surface layer than Marissa soils.

McGary silt loam, 0 to 2 percent slopes (173A).—This soil has the profile described as typical for the series. Runoff is slow. Included in mapping are small areas where this soil is deeper to subsoil than is typical.

This soil is suited to crops or pasture. Wetness and low fertility are the main limitations to use. A complete fertilizer is needed for crops, though response to fertilizer is limited. Surface drains can be used. Tile drains are not effective; the clayey subsoil is too slowly permeable. (Management group IIIw–1)

McGary silt loam, 2 to 4 percent slopes, eroded (173B2).—This soil has lost some of the original surface and subsurface layers through erosion. In places the plow layer consists partly of clayey subsoil material. Runoff is medium to rapid. Included in mapping are areas where this soil is only slightly eroded.

The main limitations to use of this soil are erosion, low fertility, and poor tilth. Slopes are short and make cultivation of this soil difficult. Tilth can be improved by

applying manure and by returning all crop residue to the soil. (Management group IIIe-4)

McGary silt loam, 4 to 10 percent slopes, eroded (173C2).—The combined thickness of the surface and subsurface layers of this soil is less than that in the profile described as typical for the series. In places the plow layer consists partly of clayey subsoil material. Runoff is medium to rapid. Included in mapping are a few areas where this soil is only slightly eroded and small areas where the subsoil material is lighter colored than is typical.

In places this soil is cultivated, but many areas are wooded. The main limitations to use of this soil are erosion, low fertility, and poor tilth. Where this soil is cultivated, a complete fertilizer and practices to control erosion are needed. Grasses and legumes should be grown in the cropping system. Wooded areas of this soil are less susceptible to erosion. (Management group IIIe-4)

McGary soils, 4 to 10 percent slopes, severely eroded (173C3).—These soils have lost most or all of the original surface and subsurface layers, and the plow layer consists of clayey subsoil material. The surface layer ranges from silt loam to silty clay in texture. Slopes are short, and runoff is rapid. Included in mapping are small areas where these soils have a lighter colored subsoil than is typical.

Most areas of these soils are cultivated. These soils are well suited to permanent vegetation, such as grasses and legumes. Wheat can be grown occasionally. The main limitations to use are erosion, low fertility, and very poor tilth. (Management group IVe-4)

Montgomery Series

The Montgomery series consists of deep, poorly drained, nearly level soils on stream terraces. They formed in Wisconsin-age sediments.

In a typical profile the surface layer is very dark gray silty clay about 15 inches thick. The next layer is silty clay about 40 inches thick. The upper 7 inches is dark gray, the next 10 inches is dark grayish brown, and the lower 23 inches is olive gray and is mottled. The underlying material to a depth of about 65 inches is mottled, light olive-brown light silty clay.

Montgomery soils are medium in organic-matter content and medium to high in natural fertility. These soils are slowly permeable. The available water capacity is high.

Representative profile of Montgomery silty clay, northeast corner of sec. 17, NE2½, NE10, NE40, NE160, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 6 inches, very dark gray (10YR 3/1) silty clay; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A1—6 to 15 inches, very dark gray (10YR 3/1) silty clay; few, fine, distinct mottles of light olive brown (2.5Y 5/4); moderate, medium, granular structure; firm; slightly acid; clear, smooth boundary.

B11g—15 to 22 inches, dark-gray (10YR 4/1) silty clay; few, fine, distinct mottles of light olive brown (2.5Y 5/4); moderate, medium, angular blocky structure; firm; slightly acid; clear, smooth boundary.

B12g—22 to 32 inches, dark grayish-brown (2.5Y 4/2) silty clay; few, medium, faint mottles of light olive brown (2.5Y 5/6); moderate, medium, angular blocky structure; firm; few, discontinuous films of very dark gray (2.5Y 3/0) clay on ped surfaces; neutral; clear, smooth boundary.

B21g—32 to 42 inches, olive-gray (5Y 5/2) silty clay; few, fine, distinct mottles of yellowish brown (10YR 5/6) and olive yellow (2.5Y 6/6); strong, fine, prismatic structure that breaks to moderate, medium, angular blocky; very firm; continuous films of very dark gray (2.5Y 3/0) clay on ped surfaces; neutral; gradual, smooth boundary.

B22g—42 to 50 inches, olive-gray (5Y 5/2) silty clay; many, fine, distinct mottles of olive yellow (2.5Y 6/6); moderate, fine and medium, angular blocky structure; firm; discontinuous films of dark-gray (2.5Y 4/0) clay on ped surfaces; neutral; gradual, smooth boundary.

B3g—50 to 55 inches, olive-gray (5Y 5/2) silty clay; many, fine, faint mottles of olive (5Y 5/4); weak, medium, subangular blocky structure; firm; mildly alkaline; gradual, smooth boundary.

Cg—55 to 65 inches, light olive-brown (2.5Y 5/4) light silty clay; common, fine, distinct mottles of yellowish brown (10YR 5/8); massive; firm; moderately alkaline.

The Ap horizon is normally silty clay, but it is silty clay loam where these soils grade to Patton soils. The Ap horizon is light clay in level soils. The combined thickness of the Ap and A1 horizons is 12 to 20 inches. Depth to the calcareous C horizon is 30 to 60 inches. The C horizon ranges from silty clay loam to silty clay in texture. Calcium concretions are few to many in the C horizon.

Montgomery soils are more clayey than Patton soils and not so poorly drained as Darwin soils.

Montgomery silt clay (0 to 2 percent slopes) (465).—The areas of this soil are generally large. Runoff is slow. Included with this soil in mapping are small spots of Patton soils.

This soil requires good management for crops. Tilth is poor, and wetness is a hazard. Crop residues should be returned to the soil to improve tilth. (Management group IIw-4)

Newberry Series

The Newberry series consists of deep, poorly drained, nearly level soils. These soils occur in low-lying areas in the claypan prairies. They formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is very dark grayish-brown and dark-gray silt loam about 12 inches thick. The subsurface layer is mottled silt loam about 7 inches thick. The upper part is grayish brown and the lower part is light brownish gray. The next layer is mottled, gray silty clay loam about 29 inches thick. The underlying material to a depth of about 60 inches is mottled, gray silty clay loam.

Newberry soils are low in organic-matter content and natural fertility. They are slowly permeable and have high available water capacity.

Representative profile of Newberry silt loam, NW2½, NW10, NW40, NE160, sec. 18, T. 3 N., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—7 to 12 inches, dark-gray (10YR 4/1) silt loam that has small spots of very dark grayish brown (10YR 3/2) and few, fine, distinct mottles of strong brown (7.5YR 5/6); weak, thin, platy structure that breaks to fine, crumb; friable; medium acid; clear, smooth boundary.

A21—12 to 16 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/4 and 5/8); weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

A22—16 to 19 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/4 and 5/8); weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

B1—19 to 22 inches, gray (10YR 6/1) and light brownish-gray (10YR 6/2) light silty clay loam; many, fine, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8); moderate, fine, subangular blocky structure; firm; films of dark grayish-brown (10YR 4/2) clay along root channels; strongly acid; clear, smooth boundary.

B2t—22 to 40 inches, gray (10YR 6/1) silty clay loam; many, fine, distinct mottles of dark brown (7.5YR 4/4) and yellowish-brown (10YR 5/8); moderate, fine and medium, subangular blocky structure; firm; few, discontinuous films of gray (10YR 5/1) clay on ped surfaces; films of dark grayish-brown (10YR 4/2) clay along root channels; strongly acid; clear, wavy boundary.

IIB3t—40 to 48 inches, gray (10YR 5/1) silty clay loam that has some grit; many, fine, distinct mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6 and 5/8); weak, medium, subangular blocky structure; firm; few, discontinuous films of dark-gray (10YR 4/1) clay on ped surfaces; films of dark-gray (10YR 4/1) clay along root channels; strongly acid; gradual, wavy boundary.

IIC—48 to 60 inches, gray (10YR 5/1) gritty silty clay loam; common, medium, distinct mottles of dark brown (7.5YR 4/4); many, fine, faint mottles of dark grayish brown (10YR 4/2), and few, fine, distinct mottles of yellowish red (5YR 4/8); massive or weak, coarse, subangular blocky structure; firm; medium acid.

The A1 horizon is generally dark gray (10YR 4/1), very dark gray (10YR 3/1), or very dark grayish brown (10YR 3/2). Iron and manganese concretions are few to many in all horizons.

Newberry soils occur in association with Ebbert and Cisne soils. Newberry soils have a lighter colored surface layer than Ebbert soils. The change in texture from the surface layer to the subsoil is not so abrupt in Newberry soils as it is in Cisne soils.

Newberry silt loam (0 to 2 percent slopes) (218).—Runoff is slow or ponded on this soil.

Where drained and fertilized, this soil is suited to crops. Wetness and low fertility are the main limitations to use. Tile drains are not effective, because permeability is too slow. Erosion is only a slight hazard. (Management group IIw–1)

Patton Series

The Patton series consists of deep, poorly drained, nearly level soils on stream terraces. These soils occur only in Edwards County. They formed in Wisconsin-age sediments.

In a typical profile the surface layer is very dark gray silty clay loam about 15 inches thick. The next layer is grayish and brownish silty clay loam about 32 inches thick. The underlying material to a depth of about 65 inches is mottled, grayish-brown light silty clay loam.

Patton soils are medium to high in organic-matter content and natural fertility. These soils have moderate to moderately slow permeability. The available water capacity is high.

Representative profile of Patton silty clay loam, NW2½, SW10, SW40, SW160, sec. 8, T. 3 S., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) to black (10YR 2/1) silty clay loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A1—7 to 15 inches, very dark gray (10YR 3/1) to black (10YR 2/1) silty clay loam; few, fine, distinct mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure that breaks to moderate, fine, granular; friable; neutral; gradual, smooth boundary.

B1—15 to 20 inches, silty clay loam that has very dark gray (10YR 3/1) ped exteriors and dark grayish-brown (2.5Y 4/2) ped interiors; common, fine, faint mottles of grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6); moderate, fine and medium, prismatic structure that breaks to moderate, medium, subangular blocky; firm; neutral; gradual, smooth boundary.

B21g—20 to 28 inches, silty clay loam that has dark-gray (10YR 4/1) ped exteriors and dark grayish-brown (2.5Y 4/2) ped interiors; few, fine, distinct mottles of yellowish brown (10YR 5/6) and common, fine, faint mottles of olive yellow (2.5Y 6/6); moderate, fine and medium, prismatic structure that breaks to moderate, fine and medium, subangular blocky; firm; few, thin clay films on ped surfaces; neutral; gradual, smooth boundary.

B22g—28 to 35 inches, silty clay loam that has dark-gray (10YR 4/1) ped exteriors and dark grayish-brown (2.5Y 4/2) ped interiors; few, fine, distinct mottles of yellowish brown (10YR 5/6) and common, fine, faint mottles of olive yellow (2.5Y 6/6); moderate, fine and medium, subangular blocky structure; firm; few, thin clay films on ped surfaces; neutral; gradual, smooth boundary.

B3g—35 to 47 inches, silty clay loam that has dark grayish-brown (2.5Y 4/2) ped exteriors and grayish-brown (2.5Y 5/2) ped interiors; common, fine, prominent mottles of light yellowish brown (10YR 6/4); moderate, medium and coarse, subangular blocky structure; few, thin clay films on ped surfaces; mildly alkaline; gradual, smooth boundary.

C1—47 to 65 inches, grayish-brown (2.5Y 5/2) light silty clay loam; common, fine, prominent mottles of strong brown (7.5YR 5/8) and yellowish brown (10YR 5/6); massive; few, vertical cleavage faces; friable; few iron and manganese stains; mildly alkaline; mildly calcareous; clear, smooth boundary.

C2—65 to 80 inches, light brownish-gray (2.5Y 6/2) stratified light silty clay loam and silt loam; many, coarse, distinct mottles of yellowish brown (10YR 5/6); massive; friable; moderately alkaline; strongly calcareous.

The Ap horizon is normally silty clay loam, but in places it is silt loam. The Ap and A1 horizons range from very dark grayish brown (10YR 3/2) to black (N 2/0). Depth to calcareous material is 30 to 55 inches. The C horizons are stratified and range from silt loam to clay loam in texture. Calcium concretions are few to many in the C horizons.

Patton soils are not so fine textured as Montgomery soils, but they are finer textured than Marissa soils. Patton soils have a darker colored surface layer than Petrolia soils and are not so acid.

Patton silty clay loam (0 to 2 percent slopes) (142).—The areas of this soil generally are large. Runoff is slow or ponded. Included with this soil in mapping are small areas of Montgomery and Marissa soils. Also included are areas north of Grayville where this soil is covered with a layer of light-colored silt loam overwash that is 8 to 20 inches thick.

This soil is well suited to all the crops commonly grown in the survey area. Management is needed to improve

tilth and reduce wetness. Surface and subsurface drains can be installed, and diversion terraces are needed in places to intercept runoff from higher areas. This soil generally is plowed in spring. Where this soil is covered with silt loam overwash, tilth is good but the soil needs more fertilizer, especially nitrogen, than typical Patton silty clay loam. (Management group IIw–4)

Petrolia Series

The Petrolia series consists of deep, poorly drained, nearly level soils that formed in silt and clay alluvium. These soils are mostly on the bottom lands of larger streams throughout the two counties.

In a typical profile the surface layer is dark grayish-brown silty clay loam about 12 inches thick. The next layer is silty clay loam about 41 inches thick. The upper part is grayish brown and mottled, and the lower part is light brownish gray and gray. The underlying material to a depth of about 65 inches is mottled, olive-gray and gray silty clay loam.

Petrolia soils are low in organic-matter content and natural fertility. They have a high available water capacity and moderately slow permeability. Unless protected by levees, Petrolia soils generally are flooded every year.

Representative profile of Petrolia silty clay loam, SW2½, SE10, NE40, NE160, sec. 9, T. 3 S., R. 14 W., in a wooded area:

A11—0 to 3 inches, dark grayish-brown (10YR 4/2) silty clay loam that has splotches of very dark grayish brown (10YR 3/2); strong, fine, granular structure; friable; slightly acid; clear, smooth boundary.

A12—3 to 12 inches, dark grayish-brown (2.5YR 4/2) silty clay loam; few, fine, faint mottles of grayish brown (2.5Y 5/2); moderate, fine and medium, angular blocky structure; firm; slightly acid; clear, smooth boundary.

B2g—12 to 24 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/6 and 5/8); moderate, medium, angular blocky structure; firm; slightly acid; clear, smooth boundary.

B3g—24 to 53 inches, light brownish-gray (2.5Y 6/2) and gray (5Y 5/1) silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6 and 5/8); weak, medium, subangular blocky structure; firm; slightly acid; abrupt, smooth boundary.

Cg—53 to 65 inches, olive-gray (5Y 5/2) and gray (5Y 6/1) silty clay loam; many, fine, faint mottles of olive brown (2.5Y 4/4) and few, fine, distinct mottles of yellowish brown (10YR 5/6); massive or very weak, coarse, subangular blocky structure; firm; slightly acid.

The combined thickness of the A11 and A12 horizons is 6 to 18 inches. In cultivated areas, the thickness of the darker A horizons coincides with the plowing depth. The A horizons generally are silty clay loam, but in places they are silt loam.

Petrolia soils are more clayey and less acid than Bonnie soils. Petrolia soils have a lighter colored surface layer than Patton soils and are more acid. Petrolia soils have a lighter colored surface layer than Darwin soils and contain less clay.

Petrolia silty clay loam (0 to 2 percent slopes) (288).—Runoff is slow or ponded. Wetness, floods, poor tilth, and low fertility are the main limitations to use. Where this soil is cultivated, drains, fertilizer, and protection from flooding are needed. Surface drains are more effective than tile because permeability is slow. Tilth can be improved by growing crops for green manure, by applying manure, and by returning all crop residues to the surface. Wooded areas can be managed for timber. (Management group IIIw–2)

Racoon Series

The Racoon series consists of deep, poorly drained, nearly level soils. These soils occur mostly on terraces. A few, scattered areas are on uplands throughout the two counties. About two-thirds of the total acreage of Racoon soils is in Edwards County, mainly in valleys in the southwestern part of the county. On uplands, these soils formed in loess, and on terraces they formed in loess and colluvium washed from uplands.

In a typical profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is mottled silt loam about 19 inches thick. The upper part is grayish brown and the lower part is light brownish gray. The next layer is mottled silty clay loam about 17 inches thick. The upper 10 inches is dark gray, and the lower 7 inches is gray. The underlying material to a depth of about 60 inches is mottled, gray silt loam.

Racoon soils are low in organic-matter content and natural fertility. They have high available water capacity. Permeability is slow.

Representative profile of Racoon silt loam, SW10, SE40, NE160, sec. 7, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A21—7 to 13 inches, grayish-brown (10YR 5/2) silt loam; many, fine, faint mottles of gray (10YR 6/1) and common, fine, prominent mottles of strong brown (7.5YR 5/8); weak, medium, platy structure; friable; many, fine, yellowish-red (5YR 4/6) iron stains; strongly acid; clear, smooth boundary.

A22—13 to 26 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, distinct mottles of strong brown (7.5YR 5/8); weak, medium, platy structure; friable; many, fine, yellowish-red (5YR 4/6) iron stains; strongly acid; abrupt, smooth boundary.

B2tg—26 to 36 inches, dark-gray (10YR 4/1) silty clay loam; common, fine, prominent mottles of yellowish-brown (10YR 5/8); moderate, medium, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B3tg—36 to 43 inches, gray (10YR 5/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/4); weak, medium, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

C—43 to 60 inches, gray (2.5Y 5/0) silt loam; common, fine, prominent mottles of red (2.5YR 5/8) and strong brown (7.5YR 5/8); massive; firm; medium acid.

The combined thickness of the A horizons is 24 to 32 inches. Where Racoon soils grade to Chauncey soils, the Ap horizon is slightly darker than that described. Iron and manganese concretions are few to many in all horizons. The B horizons range from medium acid to very strongly acid.

Racoon soils have a lighter colored surface layer than Chauncey soils and Cisne soils, and a thicker combined surface and subsurface layer than Wynoose soils.

Racoon silt loam (0 to 2 percent slopes) (109).—Runoff is slow. Where drained and fertilized, this soil is well suited to cultivated crops commonly grown in the two counties. Alfalfa stands may be short-lived due to wetness.

The major limitations to use of this soil are wetness and low fertility. Surface crusting occurs on finely

worked seedbeds after hard rains. (Management group IIIw-1)

Reesville Series

The Reesville series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils on stream terraces. They formed in silty sediments and Wisconsin-age loess.

In a typical profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is grayish-brown silt loam about 5 inches thick. The next layer is silty clay loam about 35 inches thick. In sequence from the top, the upper 8 inches is mottled and yellowish-brown and dark yellowish brown, the next 12 inches is grayish brown, and the lower 15 inches is mottled and yellowish brown. The underlying material to a depth of about 70 inches is mottled, yellowish-brown to light olive-brown silt loam that has thin layers of grayish-brown silty clay loam.

Reesville soils are low in organic-matter content and medium in natural fertility. They are moderately slow in permeability and have a high available water capacity.

Representative profile of Reesville silt loam, 2 to 4 percent slopes, SW10, NW40, SE160, sec. 33, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, crumb structure; friable; neutral; clear, smooth boundary.

A2—5 to 10 inches, grayish-brown (10YR 5/2) silt loam; common, fine, faint mottles of yellowish brown (10YR 5/4) and few, fine, faint mottles of gray (10YR 5/1) or light gray (10YR 6/1); moderate, medium, platy structure; friable; slightly acid; clear, smooth boundary.

B1—10 to 14 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2); moderate, medium, subangular blocky structure; firm; slightly acid; gradual, smooth boundary.

B21t—14 to 18 inches, dark yellowish-brown (10YR 4/4) silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2) and few, fine, faint mottles of yellowish brown (10YR 5/6); strong, medium, angular blocky structure; very firm; discontinuous films of dark-gray (10YR 4/1) clay on ped surfaces; medium acid; gradual, smooth boundary.

B22t—18 to 30 inches, grayish-brown (10YR 5/2) silty clay loam; few, fine, faint mottles of dark brown (10YR 4/3) and yellowish brown (10YR 5/6); strong, fine and medium, angular blocky structure; very firm; discontinuous films of very dark gray (10YR 3/1) clay on ped surfaces; slightly acid; gradual, smooth boundary.

B3—30 to 45 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, distinct mottles of dark grayish brown (2.5Y 4/2); weak to moderate, coarse, angular blocky structure; firm; films of dark-gray (10YR 4/1) clay on ped surfaces; neutral; gradual, smooth boundary.

C—45 to 70 inches, yellowish-brown (10YR 5/6) to light olive-brown (2.5Y 5/4) silt loam; common, fine, faint mottles of grayish brown (2.5Y 5/2); lenses 1 to 3 inches thick of grayish-brown (2.5Y 5/2) silty clay loam at intervals of 8 to 10 inches; massive; silt loam is friable and moderately alkaline; silty clay loam lenses are firm and strongly alkaline.

The combined thickness of the Ap and A2 horizons ranges from 0 to 20 inches, but generally is 8 to 15 inches. The Ap horizon is silt loam, except in eroded soils where it consists partly of subsoil material. Depth to calcareous material is 30 to 50 inches.

Reesville soils are not so fine textured in the subsoil and substrata as McGary soils. Reesville soils have a lighter colored surface layer than Marissa soils.

Reesville silt loam, 0 to 2 percent slopes (723A).—The profile of this soil is similar to that described as typical for the series, but the surface layer is slightly thicker. Runoff is slow.

Where drained and fertilized, this soil is suited to all the crops commonly grown in the two counties. Alfalfa may be short-lived because of wetness. The major limitations to use of this soil are wetness and low fertility. Erosion is only a slight hazard. (Management group IIw-2)

Reesville silt loam, 2 to 4 percent slopes (723B).—This soil has the profile described as typical for the series. Runoff is medium, and slopes are short. Included in mapping are small areas where this soil is eroded and has a more clayey surface layer than is typical.

Where fertilized and protected from erosion, this soil is suited to all the crops commonly grown in the two counties. Erosion and low fertility are the main limitations to use. (Management group IIe-3)

Reesville silt loam, 4 to 7 percent slopes, eroded (723C2).—This soil has lost some of the original surface and subsurface layers through erosion, and the surface layer consists partly of subsoil material. Runoff is medium to rapid. Included in mapping are small areas where this soil is severely eroded.

Where fertilized and protected from erosion, this soil is suited to all the crops commonly grown in the two counties. Erosion, low fertility, and in places, poor tilth, are the major limitations to use. Drought is a hazard for summer annual crops grown on this soil. (Management group IIIe-1)

Richview Series

The Richview series consists of deep, moderately well drained, gently sloping to moderately sloping soils on uplands of the claypan prairies. They formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is very dark grayish-brown and dark-brown silt loam about 9 inches thick. The next layer is about 39 inches thick. In sequence from the top, the upper 4 inches is dark yellowish-brown silt loam; the next 7 inches is mottled, dark yellowish-brown silty clay loam; and the lower 28 inches is mottled, yellowish-brown silty clay loam. The underlying material to a depth of about 60 inches is mottled, yellowish-brown gritty silt loam.

Richview soils are low in organic-matter content. Natural fertility is low to medium. These soils have moderately slow permeability and high available water capacity.

Representative profile of Richview silt loam, 2 to 4 percent slopes, NE2½, NE10, NE40, NW160, sec. 33, T. 2 N., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; clear, smooth boundary.

A1—7 to 9 inches, dark-brown (10YR 3/3) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

B1—9 to 13 inches, dark yellowish-brown (10YR 4/4) heavy silt loam that has splotches of dark brown (10YR 3/3 and 4/3); moderate, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—13 to 20 inches, dark yellowish-brown (10YR 4/4) silty clay loam; common, fine, faint mottles of yellowish brown (10YR 5/8) and few, fine, distinct mottles of yellowish red (5YR 5/8); moderate, fine, subangular blocky structure; firm; few, discontinuous films of dark-brown (10YR 3/3) clay on ped surfaces; strongly acid; clear, smooth boundary.

B22t—20 to 26 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, faint mottles of dark yellowish brown (10YR 4/4) and few, fine, faint mottles of pale brown (10YR 6/3); moderate, medium, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B31—26 to 34 inches, yellowish-brown (10YR 5/4) light silty clay loam; common, fine, faint mottles of light brownish gray (10YR 6/2) and brown (10YR 4/3); weak, medium, subangular blocky structure; firm; some till; common, fine, very dark brown (10YR 2/2) iron stains; strongly acid; gradual, smooth boundary.

IIB32—34 to 48 inches, yellowish-brown (10YR 5/4) gritty light silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2); weak, medium and coarse, subangular blocky structure; firm; some loess; common, fine, very dark brown (10YR 2/2) iron stains; strongly acid; gradual, smooth boundary.

IIC—48 to 60 inches, yellowish-brown (10YR 5/4) gritty silt loam; many, fine, faint mottles of pale brown (10YR 6/3); massive; friable; common, fine, very dark grayish-brown (10YR 3/2) iron stains; common, small, white till pebbles; medium acid.

The combined thickness of the A horizons is about 5 to 14 inches. In eroded soils, the Ap horizon consists partly of subsoil material and is lighter in color. The B horizons range from medium acid to strongly acid.

Richview soils have a darker surface layer than Ava and Hosmer soils and do not contain a fragipan. Richview soils have a darker surface layer than Alford soils and are not so well drained.

Richview silt loam, 2 to 4 percent slopes (4B).—This soil has the profile described as typical for the series. The areas of this soil are small. Runoff is medium. Included with this soil in mapping are small areas of eroded Richview soils that have clayey subsoil material mixed in the plow layer.

This soil is well suited to crops. Erosion is the major hazard. Erosion can be controlled by contour farming, terracing, utilizing crop residue, and sodding waterways. (Management group IIe–1)

Richview silt loam, 4 to 7 percent slopes, eroded (4C2).—The profile of this soil is similar to that described as typical for the series, but the surface layer is thinner than typical. In places the plow layer consists partly of brownish subsoil material. Runoff is medium. Included with this soil in mapping are small areas of uneroded Richview soil.

Where limed, fertilized, and protected from erosion, this soil is well suited to crops. Erosion is the main limitation to use. (Management group IIe–1)

Robbs Series

The Robbs series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils that are on uplands in the southwestern part of Edwards County. They formed in 40 to 50 inches of loess and residual sandstone material.

In a typical profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is mottled silt loam about 8 inches thick. The upper part is brown, and the lower part is pale brown. The next layer is about 26 inches thick. The upper 6 inches is mottled, pale-brown silt loam, and the lower 20 inches is mottled, grayish-brown silty clay loam. The next layer is about 20 inches thick. The upper part is mottled, brown silty clay loam, and the lower part is mottled, dark yellowish-brown silt loam. The underlying material to a depth of about 76 inches is mottled, light brownish-gray silt loam.

Robbs soils are low in organic-matter content and natural fertility. They are slowly permeable and have high available water capacity.

Representative profile of Robbs silt loam, 1 to 4 percent slopes, NW2½, NW10, NE40, SE160, sec. 34, T. 1 S., R. 10 E., in a wooded area:

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; strong, fine, crumb structure; friable; medium acid; clear, wavy boundary.

A21—6 to 10 inches, brown (10YR 5/3) silt loam; common, medium, faint mottles of dark brown (10YR 4/3); moderate, fine, crumb structure; strongly acid; clear, wavy boundary.

A22—10 to 14 inches, pale-brown (10YR 6/3) silt loam; common, fine, faint mottles of grayish brown (10YR 5/2) and few, fine, faint mottles of yellowish brown (10YR 5/6); moderate, thick, platy structure; friable; very strongly acid; clear, smooth boundary.

B1—14 to 20 inches, pale-brown (10YR 6/3) heavy silt loam; common, medium, faint mottles of light gray (10YR 7/2) and yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—20 to 32 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, faint mottles of yellowish brown (10YR 5/6) and few, fine, faint mottles of light gray (10YR 6/1); moderate, medium, subangular blocky structure; firm; few, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; extremely acid; gradual, smooth boundary.

B22t—32 to 40 inches, grayish-brown (10YR 5/2) silty clay loam; common, large, faint mottles of yellowish brown (10YR 5/6) and few, fine, distinct mottles of strong brown (7.5YR 5/6); moderate, fine and medium, subangular blocky structure; firm; few, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; extremely acid; gradual, smooth boundary.

Bx1—40 to 47 inches, brown (10YR 5/3) light silty clay loam; common, medium, faint mottles of dark yellowish brown (10YR 4/4) and few, fine, faint mottles of light brownish gray (10YR 6/2); weak, medium, subangular blocky structure; firm; some mica; extremely acid; gradual, smooth boundary.

IIBx2—47 to 60 inches, dark yellowish-brown (10YR 4/4) gritty silt loam; common, medium and coarse, distinct mottles of strong brown (7.5YR 5/6 and 5/8) and common, fine, faint mottles of light brownish gray (10YR 6/2); weak, coarse, subangular blocky structure; firm and brittle; extremely acid; clear, smooth boundary.

IIC1—60 to 76 inches, light brownish-gray (10YR 6/2) gritty silt loam; many, medium, faint mottles of yellowish brown (10YR 5/6 and 5/8); massive; friable; abundant mica; extremely acid; clear, smooth boundary.

IIC2—76 to 100 inches, yellowish-brown (10YR 5/8) to brownish-yellow (10YR 6/8) loam; common, medium, distinct mottles of strong brown (7.5YR 5/6) and few, fine, faint mottles of light gray (10YR 7/2); massive; friable; abundant mica; very strongly acid.

The combined thickness of the A horizons ranges from 0 to 20 inches, but commonly is from 6 to 16 inches. In eroded soils the Ap horizon consists partly or entirely of subsoil material. Iron and manganese concretions are few to many in all horizons.

Robbs soils commonly are associated with moderately well drained Grantsburg soils. The solum of Robbs soils formed partly in loess and partly in sandstone residuum, but that of Stoy soils formed entirely in loess, and the solum of Bluford soils formed partly in loess and partly in glacial till.

Robbs silt loam, 1 to 4 percent slopes (335B).—This soil has the profile described as typical for the series. Runoff is medium. Included in mapping are small areas where this soil is nearly level and areas where it is eroded.

Where fertilized, this soil is suited to corn, soybeans, wheat, hay, and meadow. Erosion and low fertility are the main limitations to use. Erosion control practices are needed. Diversion terraces are needed to intercept runoff from higher areas. Small areas may need to be drained by surface drains. (Management group IIe–3)

Robbs silt loam, 4 to 7 percent slopes, eroded (335C2).—The profile of this soil is similar to that described as typical for the series, but the combined thickness of the surface and subsurface layers is less than typical. Included in mapping are small areas where this soil is severely eroded and the plow layer consists mostly of subsoil material.

Where fertilized and protected from further erosion, this soil is suited to all the crops commonly grown in the two counties. It is also suited to pasture or trees. The main limitations to use of this soil are erosion, low fertility, and, in places, poor tilth. (Management group IVe–1)

Sexton Series

The Sexton series consists of deep, poorly drained, nearly level soils on stream terraces. These soils occur only in Edwards County, mostly in the southern part. They formed mainly in silty sediments but partly in stratified water-laid sediments.

In a typical profile the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is mottled, gray silt loam about 10 inches thick. The next layer is about 27 inches thick. In sequence from the top, the upper 16 inches is mottled, light brownish-gray silty clay loam; the next 6 inches is mottled, grayish-brown silty clay loam; and the lower 5 inches is grayish-brown and dark yellowish-brown silt loam. The underlying material to a depth of about 60 inches is stratified, gray, yellowish-brown, and grayish-brown silt loam, loam, and silty clay loam.

Sexton soils are low in organic-matter content and natural fertility. They are slowly permeable. Available water capacity is moderate.

Representative profile of Sexton silt loam, NE2½, NW10, NW40, SE160, sec. 9, T. 3 S., R. 14 W., in a cultivated field:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A2—8 to 18 inches, gray (10YR 6/1) silt loam; common, fine, distinct mottles of dark grayish brown (10YR 4/2) and brown (10YR 5/3); weak, medium, crumb structure; friable; some dark-brown (10YR 3/3) iron stains; medium acid; clear, smooth boundary.

B21t—18 to 34 inches, light brownish-gray (10YR 6/2) heavy silty clay loam; common, fine, distinct mottles of brown (10YR 5/3) and few, fine, faint mottles of gray (10YR 6/1); moderate, medium, prismatic structure that breaks to moderate and strong, fine, subangular blocky; firm; thin, continuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; strongly acid; clear, smooth boundary.

B22t—34 to 40 inches, grayish-brown (10YR 5/2) light silty clay loam; many, medium, faint mottles of dark yellowish brown (10YR 4/4) and common, fine, faint mottles of yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; firm; thin, discontinuous films of dark grayish-brown (10YR 4/2) clay on ped surfaces; many, black (10YR 2/1) iron stains; medium acid; clear, smooth boundary.

IIB3—40 to 45 inches, grayish-brown (10YR 5/2) and dark yellowish-brown (10YR 4/4) silt loam mixed with some sand; weak, coarse, subangular blocky structure; friable; common, black (10YR 2/1) and dark-brown (10YR 3/3) iron stains; medium acid; abrupt, smooth boundary.

IIC—45 to 60 inches, stratified, gray (10YR 5/1), yellowish-brown (10YR 5/8), dark yellowish-brown (10YR 4/4), and grayish-brown (10YR 5/2) silty clay loam, silt loam, and loam; massive; friable to firm; medium acid.

Wooded soils have a thinner, darker surface layer than that described for the series. The combined thickness of the A horizons ranges from 14 to 24 inches. Iron and manganese concretions are few to many in all horizons. Depth to the C horizon ranges from 30 to 50 inches, but generally is about 40 inches. The C horizon ranges from silty clay loam to sandy loam in texture.

Sexton soils have a thinner combined surface and subsurface layer than Racoon soils and are not so acid in the subsoil. Sexton soils are more acid in the lower subsoil and substrata than Reesville soils and are more poorly drained. Sexton soils are associated with Camden soils.

Sexton silt loam (0 to 2 percent slopes) (208).—Runoff is slow to ponded. Included in mapping are small areas where this soil is only somewhat poorly drained.

Where drained, limed, and fertilized, this soil is suitable for crops. Wetness and low fertility are the main limitations to use. Permeability is too slow for tile drains to be effective. Erosion is not a hazard. (Management group IIIw–1)

Shale Rock Land

Shale rock land (18 to 25 percent slopes) (95) is a land type that is mostly shale. It occurs as small areas on the sides of drainageways, mostly in the northern part of Richland County. Individual areas are generally less than 10 acres in size. This land type is about 80 percent shale and 20 percent shallow soils.

Slopes range from 10 to 30 percent, but are mostly 18 to 25 percent. Most or all of the original surface layer has been removed by erosion, and the remaining soil material is shallow or very shallow to shale bedrock. In severely eroded areas the shale is on the surface. Shale fragments are very small and platy. Small fragments of sandstone and siltstone are common on eroded slopes. Runoff is rapid, and most areas of Shale rock land are very droughty. Fertility is low, and erosion is a severe hazard.

Some areas in second-growth woodland, and some areas on the upper parts of slopes have a developed soil. These areas are not so droughty or shallow as the others. This developed soil has a thin, brown silt loam surface layer.

The subsoil is very strongly acid, yellowish-brown heavy silty clay loam that has a soapy feel. Thin-bedded shale generally occurs at a depth of about 24 inches.

These areas should be kept under permanent vegetation to prevent further erosion. They are suited to trees and woody plants. (Management group VIIs–2)

Sharon Series

The Sharon series consists of deep, moderately well drained, nearly level soils on bottom lands, mainly in the northern part of Richland County. These soils formed in silts and sand washed from uplands.

In a typical profile the surface layer is dark grayish-brown silt loam about 11 inches thick. The underlying material is silt loam to a depth of about 40 inches. The upper 19 inches is dark yellowish brown and yellowish brown, and the lower 10 inches is pale brown, yellowish brown, and light brownish gray. Below a depth of 40 inches is stratified loam, silt loam, and sandy loam.

Sharon soils are low in organic-matter content. They have high available water capacity, moderate permeability, and medium natural fertility.

Representative profile of Sharon silt loam, NW2½, SW10, SW40, NW160, sec. 20, T. 4 N., R. 10 E., in a pasture:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A1—7 to 11 inches, dark grayish-brown (10YR 4/2) silt loam splotched with brown (10YR 4/3); moderate, fine, crumb structure; friable; strongly acid; gradual, smooth boundary.

C1—11 to 21 inches, dark yellowish-brown (10YR 4/4) silt loam splotched with brown (10YR 4/3); very weak, coarse, crumb structure; friable; very strongly acid; gradual, smooth boundary.

C2—21 to 30 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, brown (10YR 5/3) mottles; massive; some structural cleavage; friable; strongly acid; clear, wavy boundary.

C3—30 to 40 inches, pale-brown (10YR 6/3), yellowish-brown (10YR 5/4), and light brownish-gray (10YR 6/2) silt loam; some grit; massive; friable; very strongly acid; clear, smooth boundary.

C4—40 to 60 inches, thinly stratified, grayish-brown (10YR 5/2), yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) silt loam, loam, and sandy loam; massive; friable; medium acid.

In places the Ap horizon is loam. Where Sharon soils grade to Coffeen soils, the Ap horizon is slightly darker than that described. In areas where Sharon soils grade to Belknap soils, mottles may be nearer the surface than in the profile described. The C horizons range from medium acid to very strongly acid.

Sharon soils are not so dark colored in the surface layer or so fine textured as Allison soils. Sharon soils have a lighter colored surface layer than Coffeen soils and are better drained. Sharon soils have better natural drainage and are more acid than Wakeland soils.

Sharon silt loam (0 to 2 percent slopes) (72)—This soil generally occupies the entire area of a small bottom land. This soil is flooded once every 3 or 4 years, but floods cause no permanent damage. Runoff is slow to medium.

This soil is suited to crops and is well suited to pasture or trees. Soils along stream channels scour and should be kept in grass. (Management group I–1)

Stoy Series

The Stoy series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils that occur on uplands in the southeastern part of Edwards County. These soils occupy ridgetops, drainageway side slopes, and foot slopes. They formed in 50 to 85 inches of loess underlain by Illinoian glacial till or residual sandstone material.

In a typical profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is yellowish-brown silt loam about 10 inches thick. The next layer is mottled silty clay loam about 28 inches thick. Its upper 13 inches is yellowish brown and grayish brown, and the lower 15 inches is yellowish brown. The underlying material to a depth of about 65 inches is light yellowish-brown silt loam.

Stoy soils are low in organic-matter content. They are low to medium in natural fertility. These soils are slowly permeable and have a high available water capacity.

Representative profile of Stoy silt loam, 0 to 2 percent slopes, SW2½, NE10, NW40, NE160, sec. 25, T. 2 S., R. 10 E., in a cultivated field:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A21—7 to 13 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, faint mottles of grayish brown (10YR 5/2) and few, fine, faint mottles of pale brown (10YR 6/3); moderate, medium, platy structure; friable; medium acid; clear, smooth boundary.

A22—13 to 17 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, faint mottles of light brownish gray (10YR 6/2); weak, thick, platy structure; friable; strongly acid; clear, smooth boundary.

B1—17 to 20 inches, yellowish-brown (10YR 5/4 and 5/6) light silty clay loam; common, fine, faint mottles of grayish brown (10YR 5/2); moderate, medium, subangular blocky structure; firm; thick, nearly continuous coatings of light-gray (10YR 7/1) silt on ped surfaces; strongly acid; clear, smooth boundary.

B2t—20 to 30 inches, grayish-brown (10YR 5/2) silty clay loam; many, fine, distinct mottles of strong brown (7.5YR 5/6) and common, fine, faint mottles of yellowish brown (10YR 5/6 and 5/8); moderate, medium, subangular blocky structure; firm; discontinuous films of dark yellowish-brown (10YR 4/4) clay on ped surfaces; strongly acid; gradual, smooth boundary.

Bx—30 to 45 inches, yellowish-brown (10YR 5/4) light silty clay loam; common, medium, faint mottles of grayish-brown (10YR 5/2); weak, medium, subangular blocky structure; firm; some films of dark yellowish-brown (10YR 4/4) clay on ped surfaces; slightly brittle; strongly acid; gradual, smooth boundary.

C—45 to 65 inches, light yellowish-brown (10YR 6/4) silt loam; few, fine, faint mottles of grayish brown (10YR 5/2); massive; friable; very strongly acid; clear, smooth boundary.

Wooded soils have a thinner, darker surface layer than that described. In eroded soils, the Ap horizon consists partly or entirely of subsoil material. Iron and manganese concretions are few to many in all horizons.

The solum of Stoy soils formed entirely in loess, but the solum of Bluford soils formed in loess and glacial till. The solum of Robbs soils formed in loess and sandstone residual material, and the solum of Hoyleton soils formed partly in glacial till. Stoy soils have a lighter colored surface layer than Hoyleton and Lukin soils. Stoy soils occur in association with moderately well drained Hosmer soils.

Stoy silt loam, 0 to 2 percent slopes (164A).—This soil has the profile described as typical for the series. Runoff is slow. Included with this soil in mapping is a small acreage of more poorly drained soil that has grayer colors throughout the profile.

This soil is mostly cultivated. It is suited to all the crops commonly grown in the two counties. Small areas of steeper soil are used for pasture or woodland. Wetness is a hazard, and drains may be required. Erosion is only a slight hazard. (Management group IIw–2)

Stoy silt loam, 2 to 4 percent slopes (164B).—This soil has a profile similar to that described as typical for the series, but the combined thickness of the surface and subsurface layers is only about 12 inches. Runoff is medium. Included in mapping are small areas where this soil is eroded and the plow layer consists partly of subsoil material. Also included are areas on foot slopes where this soil has surface and subsurface layers that are more than 24 inches in combined thickness.

This soil is suited to corn, soybeans, wheat, hay, and meadow. It also is suited to trees or pasture. Erosion and low fertility are the major limitations to use of this soil. Erosion can be controlled by terracing and contour farming. (Management group IIe–3)

Stoy silt loam, 4 to 7 percent slopes, eroded (164C2).—This soil has lost much of the original surface and subsurface layers through erosion. Generally, only about 4 or 5 inches of surface soil remains. In places the plow layer consists partly of subsoil material. Runoff is medium. Included in mapping are small areas where this soil is not eroded, and small areas where it is severely eroded. The surface layer of the severely eroded soil consists of mottled subsoil material.

Where fertilized and protected from erosion, this soil is suited to all the crops commonly grown in the two counties. This soil is also suited to pasture or trees. Drought is a hazard for corn and soybeans grown on this soil. Use of this soil is limited by erosion, low fertility, and in places, poor tilth. Management is needed to control erosion. (Management group IVe–1)

Tamalco Series

The Tamalco series consists of deep, moderately well drained, nearly level to moderately sloping soils on uplands of the claypan prairies. Tamalco soils formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is silt loam about 12 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown to brown. The next layer is about 34 inches thick. In sequence from the top, the upper 9 inches is mottled, dark-brown silty clay loam and dark yellowish-brown silty clay; the next 7 inches is mottled, grayish-brown silty clay loam; the next 12 inches is mottled, light brownish-gray silty clay loam; and the lower 6 inches is strongly alkaline, grayish-brown, gray and dark yellowish-brown silty clay loam. The underlying material to a depth of about 60 inches is strongly alkaline, mottled, light brownish-gray clay loam.

Tamalco soils are low in organic-matter content and natural fertility. Response to fertilizer is only fair because the soils have poor physical properties and the sodium content of the subsoil is high. Permeability is slow to very slow, and the available water capacity is low to moderate.

Representative profile of Tamalco silt loam, 0 to 2 percent slopes, SW10, NW40, NW160, sec. 20, T. 3 N., R. 9 E., in a cultivated field:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, crumb structure; friable; slightly acid; abrupt, smooth boundary.

A1—5 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; medium acid; clear, smooth boundary.

A2—9 to 12 inches, grayish-brown (10YR 5/2) to brown (10YR 5/3) silt loam; few, fine, faint mottles of yellowish brown (10YR 5/8); weak, thin, platy structure; friable; strongly acid; abrupt, smooth boundary.

B21t—12 to 15 inches, dark-brown (7.5YR 4/4) heavy silty clay loam; many, fine, distinct mottles of yellowish red (5YR 4/8); strong, very fine, subangular blocky structure; very firm; common, discontinuous films of brown (7.5YR 4/2) and grayish-brown (10YR 5/2) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B22t—15 to 21 inches, dark yellowish-brown (10YR 4/4) silty clay; moderate, fine, subangular blocky structure; very firm; common, discontinuous films of brown (10YR 4/3) clay on ped surfaces; very strongly acid; clear, smooth boundary.

B23t—21 to 28 inches, grayish-brown (10YR 5/2) heavy silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6); weak, medium to coarse, subangular blocky structure; very firm; neutral; gradual, wavy boundary.

B31—28 to 40 inches, light brownish-gray (10YR 6/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6 and 5/8); weak, coarse, subangular blocky structure; firm; moderately alkaline; clear, wavy boundary.

IIB32—40 to 46 inches, grayish-brown (10YR 5/2), gray (10YR 5/1), and dark yellowish-brown (10YR 4/4) gritty light silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/8); weak, coarse, subangular blocky structure; firm; strongly alkaline; gradual, wavy boundary.

IIC—46 to 60 inches, light brownish-gray (10YR 6/2) clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6); massive; slightly firm; strongly alkaline.

Where these soils grade to Hoyleton and Cisne soils, the Ap horizon is slightly darker in color. In eroded soils the Ap horizon consists partly or entirely of clayey subsoil material. The A horizons and the upper B horizons range from slightly acid to very strongly acid; the lower B horizons and the C horizon range from neutral to strongly alkaline. Iron and manganese concretions and stains generally are few to many in all horizons.

Tamalco soils are mapped in association with Huey, Cisne, and Hoyleton soils. Tamalco soils are better drained than Huey soils, and part of the Tamalco subsoil is acid. Tamalco soils contain more exchangeable sodium than Hoyleton or Cisne soils and have a lighter colored surface layer.

Tamalco silt loam, 0 to 2 percent slopes (581A).—This soil has the profile described as typical for the series. Runoff is slow to medium. Included in mapping are small areas where this soil has a thicker combined surface and subsurface layer than is typical.

This soil is suited to all the crops commonly grown in the two counties. It is well suited to wheat. Drought is a hazard for corn and soybeans grown on this soil. Low fertility and droughtiness are the main hazards to use, and erosion is a hazard where slopes are more than 1 percent. (Management group IIIs–1)

Tamalco silt loam, 2 to 4 percent slopes, eroded (581B2).—This soil has lost some of the original surface layer through erosion, and the plow layer consists partly of dark-brown subsoil material. Runoff is medium to rapid. Included in mapping are areas where this soil is only slightly eroded. These areas make up one-third of the total acreage mapped.

Where this soil is used for crops, a complete fertilizer is needed. Drought is a hazard for corn and soybeans grown on this soil. Erosion is a severe hazard, and areas of this soil in long, narrow drainageways should be permanently sodded. Areas of this soil adjacent to drainageways should be seeded to grasses and legumes. Erosion, low fertility, droughtiness, and, in places, poor tilth are the main limitations to use. (Management group IIIs–1)

Tamalco soils, 3 to 7 percent slopes, severely eroded (581C3).—This soil has lost most or all of the original surface and subsurface layers through erosion, and the plow layer consists of dark-brown subsoil material. The surface layer ranges from silty clay loam to silty clay in texture. Runoff is rapid, and slopes generally are short. Included in mapping are small areas where this soil is not so severely eroded.

This soil is suited to grasses and legumes. Wheat can be grown occasionally. Erosion, low fertility, poor tilth, and droughtiness are the major limitations to use. (Management group IVe–4)

Wakeland Series

The Wakeland series consists of deep, somewhat poorly drained, slightly acid to neutral soils that formed in silty sediments. These nearly level soils are on bottom lands.

In a typical profile the surface layer is dark grayish-brown silt loam about 12 inches thick. The underlying material to a depth of about 60 inches is mottled, grayish-brown silt loam.

Wakeland soils are low in organic-matter content and natural fertility. They have a high available water capacity and moderate permeability. These soils are subject to flooding.

Representative profile of Wakeland silt loam, SE2½, NE10, NW40, SE160, sec. 32, T. 2 S., R. 14 W., in a cultivated field:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) to brown (10YR 4/3) silt loam; moderate, fine, crumb structure; friable; neutral; abrupt, smooth boundary.

A1—8 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint mottles of pale brown (10YR 6/3) and few, fine, distinct mottles of dark brown (7.5YR 4/4); moderate, medium, platy structure; friable; slightly acid; clear, smooth boundary.

Bg—12 to 30 inches, grayish-brown (10YR 5/2) silt loam; many, fine, faint, brown (10YR 4/3) mottles; weak, very fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

Cg—30 to 60 inches, grayish-brown (2.5Y 5/2) silt loam; common, fine, distinct mottles of dark yellowish brown (10YR 4/4); massive; friable; very dark brown (10YR 2/2) iron stains; slightly acid.

The Ap horizon is normally silt loam, but in a few places it is loam. Where these soils grade to Petrolia soils, the Ap horizon may be light silty clay loam. The combined thickness of the Ap and A1 horizons ranges from about 6 to 18 inches. Reaction of the Bg horizon ranges from slightly acid to neutral, but is medium acid where these soils grade to Belknap soils. Iron and manganese concretions generally are few to many in all horizons.

The subsoil of Wakeland soils is not so acid as that of Belknap soils. Wakeland soils are not so clayey as Petrolia soils or so poorly drained. Wakeland soils have a lighter colored surface layer than Coffeen soils.

Wakeland silt loam (0 to 2 percent slopes) (333).—Runoff is slow. Included in mapping are small areas where this soil is gently sloping.

Where drained, fertilized, and protected from floods, this soil is suited to all the crops commonly grown in the two counties. Floods, low fertility, and poor drainage are the main limitations to use of this soil. Only summer annual crops can be grown where these soils are not protected by levees from winter flood. In wet areas, surface drains are needed. (Management group IIw–3)

Wellston Series

The Wellston series consists of moderately deep, well-drained, strongly sloping to steep soils. These soils are on uplands, mainly in the southern part of Edwards County. They formed in very thin layers of loess underlain by residual sandstone material and bedrock (fig. 9).

In a typical profile the surface layer is brown silt loam about 5 inches thick. The next layer is about 25 inches thick. The upper 9 inches is dark yellowish-brown silt loam and silty clay loam; the lower 16 inches is brown silty clay loam that contains some sandstone. Below a depth of 30 inches is sandstone bedrock.

Wellston soils are low in organic-matter content and natural fertility. Response to fertilizer is limited because the soils are shallow and droughty. Available water capacity is moderate. Permeability is moderate above the bedrock. In spring, the water table may perch on the bedrock.

Representative profile of Wellston silt loam, 12 to 18 percent slopes, eroded, SW2½, NE10, SE40, SE160, sec. 28, T. 2 S., R. 10 E., in a wooded area:

Ap—0 to 5 inches, brown (10YR 4/3) silt loam; moderate, medium, crumb structure; friable; medium acid; clear, smooth boundary.

Figure 9.—Roadbank in southwestern Edwards County exposes sandstone bedrock and residual material underlying Zanesville and Wellston soils.

B1—5 to 9 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B2t—9 to 14 inches, dark yellowish-brown (10YR 4/4) silty clay loam; few, fine, faint mottles of yellowish brown (10YR 5/4); moderate, fine, subangular blocky structure; firm; some mica; very strongly acid; clear, smooth boundary.

IIB3—14 to 30 inches, light silty clay loam that has brown (7.5YR 4/4) ped interiors and yellowish-brown (10YR 5/4) ped exteriors; weak, medium, subangular blocky structure; friable; abundant mica and common sandstone fragments; extremely acid; abrupt, smooth boundary.

R—30 inches +, sandstone cobblestones, loose material, and hard bedrock that has colors of strong brown (7.5YR 5/6) and brown (7.5YR 4/4); extremely acid.

In wooded areas, the A horizon and B horizons are slightly thicker and more distinct than described, and the surface layer is thinner and darker. The Ap horizon normally is silt loam. In eroded soils it consists partly or entirely of subsoil material. Iron and manganese concretions are few to many. The B horizons range from medium acid to extremely acid. Loess ranges from 0 to 20 inches in thickness. Depth to hard bedrock generally is 2 to 4 feet. Rock crops out in places. The Wellston soils in Edwards and Richland Counties have a thinner loess cap and contain more sandstone fragments than the range defined for the series, but this difference does not affect their use or management.

Wellston soils have a thinner loess cap than Zanesville soils and are shallower to bedrock. Zanesville soils have a fragipan, but the Wellston soils do not.

Wellston silt loam, 12 to 18 percent slopes, eroded (339E2).—This soil has the profile described as typical for the series. Runoff is rapid. Included in mapping are small areas where this soil is less than 2 feet deep to bedrock.

The steeper areas of this soil are suited to trees. The less sloping areas are suited to permanent pasture, and small grains can be grown occasionally. The main limitations to use of this soil are erosion, low fertility, and droughtiness. (Management group VIs–1)

Wellston silt loam, 18 to 30 percent slopes, eroded (339F2).—This soil has a profile similar to that described as typical for the series, but in wooded areas this soil has a thin cover of darker material on the surface. Runoff is rapid. Included in mapping are small areas where this soil is less than 2 feet deep to bedrock.

This soil generally is in trees, and can be managed for timber. Cleared areas can be planted to adapted pines. Less sloping areas of this soil are suited to improved permanent pasture. (Management group VIIs–1)

Wellston soils, 7 to 12 percent slopes, severely eroded (339D3).—These soils have lost the original surface layer through erosion. The surface layer consists of subsoil material and ranges from silt loam to silty clay loam in texture. Small fragments of sandstone occur on the surface. Runoff is rapid. Included in mapping are a few areas where these soils are gullied.

These soils are suited to trees or permanent pasture. A small grain can be grown occasionally. The major limitations to use of these soils are erosion, low fertility, and droughtiness. (Management group VIs–1)

Wellston soils, 12 to 30 percent slopes, severely eroded (339E3).—These soils have lost the original surface layer through erosion. The surface layer consists of yellowish subsoil material and ranges from silt loam to silty clay loam in texture. In places, small fragments of sandstone are on the surface. Runoff is rapid. Included in mapping are small areas where these soils are gullied and areas where they are less than 2 feet deep to bedrock.

These soils are suited mainly to permanent vegetation. Less sloping areas are suited to permanent pasture. The major limitations to use of these soils are erosion, low fertility, droughtiness, and poor tilth. (Management group VIIs–1)

Wynoose Series

The Wynoose series consists of deep, poorly drained, nearly level soils. These soils occur on uplands throughout Richland County and in the northern part of Edwards County. They formed in 20 to 50 inches of loess and Illinoian glacial till.

In a typical profile the surface layer is grayish-brown silt loam about 6 inches thick. The subsurface layer is mottled, light brownish-gray silt loam about 10 inches thick. The next layer is about 34 inches thick. The upper 13 inches is mottled, gray silty clay loam and silty clay; the next 13 inches is mottled, gray silty clay loam; and the lower 8 inches is mottled, light brownish-gray silty clay loam. The underlying material to a depth of about 70 inches is light-gray and light brownish-gray silty clay loam.

Wynoose soils are very low in organic-matter content and natural fertility. They have high available water capacity and very slow permeability.

Representative profie of Wynoose silt loam, SW2½, SW10, NW40, SW160, sec. 1, T. 1 S., R. 10 E., in a cultivated field:

Ap—0 to 6 inches, grayish-brown (10YR 5/2) silt loam; weak, medium, crumb structure; friable; medium acid; abrupt, smooth boundary.

A2—6 to 16 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, distinct mottles of yellowish brown (10YR 5/4); weak, thick, platy structure; friable; strongly acid; clear, smooth boundary.

B&A—16 to 19 inches, gray (10YR 6/1) silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/4); strong, fine, columnar structure that breaks to moderate, medium, subangular blocky; firm; thick, nearly continuous coatings of light-gray (10YR 7/1) silt on ped surfaces; very strongly acid; clear, smooth boundary.

B21t—19 to 29 inches, gray (10YR 6/1) silty clay; common, fine, distinct mottles of yellowish brown (10YR 5/6) and few, medium, prominent mottles of yellowish red (5YR 4/8); strong, fine, prismatic structure that breaks to moderate, medium, subangular blocky; very firm; very strongly acid; clear, smooth boundary.

B22t—29 to 42 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and yellowish red (5YR 4/8); moderate, medium, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

IIB3—42 to 50 inches, light brownish-gray (10YR 6/2) gritty silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; firm; very strongly acid; gradual, smooth boundary.

IIC—50 to 70 inches, light-gray (10YR 6/1) and light brownish-gray (10YR 6/2) gritty silty clay loam; many, coarse, distinct mottles of yellowish brown (10YR 5/8); massive; firm; strongly acid.

The combined thickness of the Ap and A2 horizons ranges from 12 to 23 inches, but commonly is 15 to 18 inches. Where Wynoose soils grade to Cisne soils, the Ap horizon is darker and thicker. Iron and manganese concretions are few to many

in all horizons. The B horizons range from medium acid to very strongly acid, and they are extremely acid in places.

Wynoose soils have a lighter colored surface layer than Cisne and Chauncey soils and a thinner combined surface and subsurface layer than Racoon soils. Wynoose soils are more acid than Sexton soils and more clayey in the subsoil and substrata.

Wynoose silt loam (0 to 2 percent slopes) (12).—Runoff is slow. Included with this soil in mapping are small areas of Bluford soils. Where drained and fertilized, this soil is suited to crops. Use of this soil is limited by wetness and low fertility. Surface crusting may occur after rain on finely worked seedbeds. (Management group IIIw–1)

Zanesville Series

The Zanesville series consists of deep, moderately well drained and well drained, strongly sloping to moderately steep soils. These soils are on uplands, mostly in the southern part of Edwards County. They formed in 20 to 40 inches of loess and residual sandstone material.

In a typical profile the surface layer is silt loam about 8 inches thick. The upper part is brown, and the lower part is light yellowish brown. The next layer is about 37 inches thick. The upper 4 inches is yellowish-brown silt loam, the next 18 inches is brown silty clay loam, and the lower 15 inches is yellowish-brown silty clay loam. The underlying material is sandstone bedrock.

Zanesville soils are low in organic-matter content and natural fertility. They are moderately permeable in the upper part, and they are slowly permeable in the fragipan. Available water capacity is moderate.

Representative profile of Zanesville silt loam, 7 to 12 percent slopes, eroded, SE10, SW40, SE160, sec. 34, T. 2 S., R. 10 E., in a wooded area:

A1—0 to 3 inches, brown (10YR 4/3) silt loam; weak, thin, platy structure; very friable; slightly acid; abrupt, smooth boundary.

A2—3 to 8 inches, light yellowish-brown (10YR 6/4) silt loam; moderate, thin, platy structure; very friable; strongly acid; clear, smooth boundary.

B1—8 to 12 inches, yellowish-brown (10YR 5/6) heavy silt loam; moderate, fine, subangular blocky structure; coatings of pale-brown (10YR 6/3) silt on ped surfaces; firm; very strongly acid; clear, smooth boundary.

B2t—12 to 30 inches, brown (7.5YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; few, discontinuous films of dark-brown (7.5YR 4/4) clay on ped surfaces; firm; very strongly acid; clear, smooth boundary.

IIBx—30 to 45 inches, yellowish-brown (10YR 5/4) gritty light silty clay loam; weak, coarse, subangular blocky structure; discontinuous coatings of gray (10YR 6/1) silt on ped surfaces and accumulations of pale-brown (10YR 6/3) silty material; firm; fragipan; highly micaceous sandstone residuum; very strongly acid.

R—45 inches+, soft, brown (7.5YR 4/4) cobblestones consisting of micaceous sandstone; loose material and bedrock.

In places the A1 and A2 horizons are partly or entirely eroded and the surface layer consists of yellowish-brown (10YR 5/6) subsoil material. Iron and manganese concretions generally are few to many in all horizons. The B1 and B2t horizons range from slightly acid to very strongly acid. Loess ranges from 20 to 40 inches in thickness. Depth to bedrock commonly is from 3 to 6 feet.

Zanesville soils are associated with Grantsburg and Wellston soils. Zanesville soils formed in a thinner layer of loess and have a thinner fragipan than Grantsburg soils. Zanesville soils formed in a thicker layer of loess than Wellston soils and are deeper to bedrock.

Zanesville silt loam, 7 to 12 percent slopes, eroded (340D2).—This soil has the profile described as typical for the series. Runoff is medium to rapid. Included with this soil in mapping are small areas of Grantsburg and Wellston soils.

This soil is suited to permanent pasture and hay. A small grain can be grown occasionally. Existing stands of trees can be managed for timber. Use of this soil is limited by erosion, low fertility, and droughtiness. (Management group IVe–3)

Zanesville silt loam, 12 to 18 percent slopes, eroded (340E2).—The profile of this soil is similar to that described as typical for the series, but it has stronger slopes. Runoff is rapid. Included in mapping are small areas where this soil is only slightly eroded.

Most of this soil is wooded and can be managed for timber. Cleared areas are suited to tree plantings and to permanent pasture. A small grain can be grown occasionally. Erosion is the main limitation to use of this soil. (Management group VIe–2)

Zanesville soils, 7 to 12 percent slopes, severely eroded (340D3).—These soils have lost most or all of the original surface and subsurface layers through erosion. The surface layer consists of yellowish subsoil material and ranges from silt loam to silty clay loam in texture. Runoff is rapid. Included in mapping are small areas where these soils are gullied. Also included are small areas of severely eroded Grantsburg soils.

These soils are suited to permanent pasture. They are well suited to plantings of pine. A small grain can be grown occasionally. The major limitations to use of these soils are erosion, low fertility, droughtiness, and poor tilth. Management is needed to control erosion. (Management group VIe–2)

Use and Management of the Soils

This section has six main parts. The first part groups the soils into management units and explains the capability classification used by the Soil Conservation Service to show the relative suitability of the soil for various uses. The second part consists mainly of a table giving the estimated yields under a high level of management. The third part groups the soils into woodland suitability groups. The fourth part shows the suitability of the soils for wildlife habitats and gives information on the kinds of wildlife in the two counties. The fifth part discusses the use of soils for recreational purposes. The sixth part consists of soil engineering data and interpretations.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into con-

sideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or engineering.

In the capability system, all kinds of soils are grouped at three levels: the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife. (No class V soils are in Edwards and Richland Counties.)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (No class VIII soils are in Edwards and Richland Counties.)

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry. (No *c* subclasses are in Edwards and Richland Counties.)

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

Management Groups are soil groups within the subclasses. The soils in one group are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Management groups are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIs-1.

The management groups of the soils in Edwards and Richland Counties is given in the Guide to Mapping Units at the end of this survey.

Management groups

In the following pages the management groups in Edwards and Richland Counties are described and suggestions for use and management for all the soils of each group are given. Soils used for cultivated crops generally need lime and fertilizers. The amounts to apply on a given soil should be determined by soil tests. The names of soil series represented are mentioned in the description of each management group, but this does not mean that all soils of a given series appear in the unit. To find the names of all the soils in any given management group, refer to the "Guide to Mapping Units" at the back of this survey.

MANAGEMENT GROUP I-1

This group consists of deep, moderately well drained to well drained, nearly level to moderately sloping soils of the Allison, Sharon, and Camden series. Allison and Sharon soils are on bottom lands, and Camden soils are on terraces. The Camden soils have a silty clay loam subsoil. The Sharon soils are silt loam throughout, and the Allison soils are silty clay loam throughout.

These soils are medium in fertility, have a high available water capacity, and are moderately permeable. Organic-matter content is low to medium. These soils are low in nitrogen and low to medium in phosphorus and potassium.

The soils in this group are well suited to all the crops commonly grown in the survey area. Camden soils are used mainly for corn, soybeans, wheat, and red clover; Allison and Sharon soils are used for corn and soybeans. Under a high level of management, all soils can be used continuously for cultivated row crops or wheat. These soils also are suited to grasses, trees, and the development of wildlife habitat.

These soils have no major limitations to use. Occasional flash floods are a hazard for soils on bottom lands. Floods may scour the soils or deposit debris and silt in fields and pasture. Small areas of these soils are managed the same way as the soils around them.

MANAGEMENT GROUP I-2

This group consists of deep, somewhat poorly drained, nearly level soils of the Coffeen and Marissa series. These soils occur on bottom lands and terraces. Marissa soils have a silty clay loam subsoil; Coffeen soils are silt loam throughout.

Fertility is low to medium in the Coffeen soils and medium to high in the Marissa soils. Both soils have a high available water capacity, moderate to moderately slow permeability, and low to medium organic-matter

content. Marissa soils are high in nitrogen, phosphorus, and potassium, and Coffeen soils are low to medium.

The soils in this group are well suited to corn, soybeans, wheat, and other row crops. They can be cropped continuously if management is at a high level and if winter cover crops are grown to add organic matter to the soil. Although generally used for grain, these soils also are well suited to hay and pasture. Most grasses and legumes can be grown.

These soils have no major limitations to use. Soils in low-lying areas are somewhat wet and may require drainage. Where outlets are available, tile drains can be used.

MANAGEMENT GROUP IIe-1

This group consists of deep, moderately well drained to well drained, gently sloping to moderately sloping soils of the Richview, Alvin, Camden, and Alford series. These soils are on uplands and terraces. Except for the Alvin soils, they have a silt loam surface layer and a silty clay loam subsoil. The Alvin soils have a fine sandy loam surface layer and a sandy clay loam subsoil. The moderately sloping Richview and Alford soils are eroded.

The soils in this group are low in nitrogen and phosphorus and low to medium in potassium. Except for the loamy Alvin soils, these soils have a high available water capacity. Alvin soils have a moderate available water capacity. Permeability is moderate to moderately slow. Organic-matter content is low.

These soils are suited to the crops commonly grown in the two counties. Corn, soybeans, wheat, alfalfa, and red clover hay are the main crops. These soils also are suited to permanent pasture, trees, and wildlife habitat.

Management is needed to control erosion and maintain fertility and organic-matter content. Crops on these soils respond well to fertilizers. Small areas of these soils generally are managed the same way as surrounding larger areas of other soils.

MANAGEMENT GROUP IIe-2

This group consists of deep, moderately well drained, gently sloping soils of the Ava, Hosmer, and Grantsburg series. These soils are on uplands. They have a silt loam surface layer and a silty clay loam subsoil that contains a fragipan. The Hosmer and Grantsburg soils are uneroded to slightly eroded, but the Ava soils are eroded.

The soils of this group are low to medium in fertility and low in organic-matter content. They are low in nitrogen and phosphorus and low to medium in potassium. The root zone is limited by the fragipan that occurs at a depth of 22 to 40 inches. This layer is slowly permeable and limits the amount of moisture available for plants.

These soils are suited to all crops commonly grown in the two counties. They are used mainly for corn, soybeans, wheat, red clover hay, and meadow. These soils also are suited to pasture, woodland, and wildlife habitat.

Management is needed to control erosion and maintain fertility and organic-matter content. Crops on these soils respond well to fertilizers. Small areas of these soils generally are managed the same way as adjacent soils.

MANAGEMENT GROUP IIe-3

This group consists of deep, somewhat poorly drained, gently sloping soils of the Hoyleton, Bluford, Stoy, Robbs, and Reesville series. These soils are on uplands and terraces. They have a silt loam surface layer and a silty clay loam subsoil.

Figure 10.—Soybeans planted on the contour on gently sloping Hoyleton silt loam.

The soils of this group are low to medium in fertility and low in organic-matter content. They are low in nitrogen and phosphorus and low to medium in potassium. Available water capacity is high. Permeability is slow except for Reesville soils, which have moderately slow permeability.

These soils are suited to the crops commonly grown in the two counties. They are used mainly for corn, soybeans, wheat, red clover hay, and meadow. They are also suited to pasture, woodland, and wildlife habitat.

Management is needed to control erosion, maintain fertility and organic-matter content, and, in places, to reduce wetness. Surface drains can be used, but tile generally is not suitable because permeability is slow. Row crops can be grown more often where these soils are contoured (fig. 10). Organic-matter content can be maintained by returning all crop residue to the soil and by growing crops for green manure.

MANAGEMENT GROUP IIw-1

This group consists of deep, poorly drained, nearly level soils of the Ebbert and Newberry series. These soils are on uplands. They have a silt loam surface layer and a silty clay loam subsoil.

The available water capacity is high, the permeability is slow, and the organic-matter content is low to medium. These soils are low in nitrogen, phosphorus, and potassium.

These soils are suited to the crops commonly grown in the two counties. Corn, soybeans, and wheat are the main crops. Red clover hay is grown mainly for green manure. Although these soils are suited to permanent pasture and wildlife habitat, they are not generally used for these purposes.

Where cultivated, these soils need drainage and fertilizers. Crop response to fertilizers is very good. A system of surface ditches can be used to drain these soils. Tile drains do not work well because permeability is slow.

Under a high level of management, which provides for drainage, for minimum tillage, for returning all crop residue to the soil, and for growing crops for green manure, row crops or wheat can be grown continuously.

MANAGEMENT GROUP IIw-2

This group consists of deep, somewhat poorly drained, nearly level soils of the Hoyleton, Bluford, Stoy, Lukin, and Reesville series. These soils are on uplands and terraces. They have a silt loam surface layer and a silty clay loam subsoil.

Available water capacity is high, permeability is slow to moderately slow, and the organic-matter content is low to medium. The soils in this group are low in nitrogen and phosphorus and low to medium in potassium.

These soils are suited to crops, pasture, woodland, and wildlife habitat. Corn, soybeans, wheat, and hay are the main crops.

Management is needed to drain these soils and maintain fertility and organic-matter content. Surface ditches provide excellent drainage on these soils. Tile lines generally function poorly. Tile functions somewhat better in the Reesville soils than in the other soils of this group.

Crops on these soils respond very well to fertilizers. Under high-level management, row crops or wheat can be grown continuously. High-level management includes heavy and balanced fertilization, minimum tillage, careful selection of adapted varieties of plants, and controlling weeds and insects. Organic-matter content can be maintained by returning all crop residue to the soil, by applying manure, and by growing crops for green manure.

MANAGEMENT GROUP IIw-3

This group consists of deep, somewhat poorly drained to well-drained, nearly level soils of the Wakeland and Belknap series. These soils are on bottom lands. They are silt loam throughout.

These soils have high available water capacity and moderate to moderately slow permeability. They are low in nitrogen and low to high in phosphorus and potassium. Belknap soils are more acid than Allison and Wakeland soils.

The soils of this group are suited to the crops commonly grown in the two counties. They are also suited to permanent pasture, woodland, and wildlife habitat. Corn and soybeans are the main cultivated crops.

Management is needed to control flooding and to maintain fertility and organic-matter content. Wetness is a hazard for soils that receive runoff from higher soils. Under a high level of management, crops can be grown continuously on these soils. High-level management includes heavy and balanced fertilization, adequate drainage, minimum tillage, returning all crop residue to the soil, and regular growing of crops for green manure.

Flood protection should be planned for an entire watershed because levees generally are inadequate or too expensive to install for single areas of these soils. Diversion ditches may be needed to intercept runoff from hillsides. Where drainage is required, surface ditches or tile drains can be used. Tile drains work more slowly in the Belknap than in the Wakeland soils.

MANAGEMENT GROUP IIw-4

This group consists of deep, poorly drained, nearly level soils of the Patton and Montgomery series. These soils are on terraces. Patton soils are silty clay loam throughout, and Montgomery soils are silty clay.

These soils have high available water capacity and moderate to slow permeability. Organic-matter content is medium to high. The content of nitrogen is medium, and the content of phosphorus and potassium is medium to high. The surface layer is slightly acid to neutral.

Where drained, these soils are well suited to cultivated crops. They are used primarily for corn, soybeans, and wheat. They are not well suited to pasture or trees. Habitat for wetland and openland wildlife can be developed on these soils.

Management is needed to drain these soils and to maintain tilth, organic-matter content, and fertility. Tile drains are adequate for Patton soils where outlet ditches are available. For adequate drainage, low-lying Montgomery soils require a system of surface ditches or a tile system of the surface-inlet type.

Tilth can be maintained and drainage can be improved by returning all crop residue to the soil and by growing a crop for green manure at least every third year. These practices also increase water infiltration and drainage. These soils should be plowed in fall. They should not be worked when they are wet.

MANAGEMENT GROUP IIIe-1

This group consists of deep, somewhat poorly drained, gently to moderately sloping soils of the Hoyleton, Bluford, and Reesville series. These soils are on uplands and terraces. Slopes generally are short, and the soils are eroded. The surface layer is silt loam, and the subsoil is silty clay loam.

The available water capacity is high, and the permeability is slow to moderately slow. Organic-matter content is low. The soils of this group are low in nitrogen and phosphorus and low to medium in potassium.

Where protected from erosion, these soils are suited to the crops commonly grown in the survey area. Corn, soybeans, wheat, and red clover and alfalfa hay are the main crops. These soils also are suited to permanent pasture, woodland, and wildlife habitat.

Management is needed to control erosion and maintain fertility and organic-matter content. Soils on long slopes and those used for row crops should be terraced and contoured to reduce erosion.

MANAGEMENT GROUP IIIe-2

This group consists of deep, well drained and moderately well drained, moderately sloping and strongly sloping soils of the Hickory, Alvin, and Alford series. These soils are on uplands and terraces. Hickory soils have a loam surface layer and a clay loam subsoil; Alford soils have a silt loam surface layer and a silty clay loam subsoil; and Alvin soils have a fine sandy loam surface layer and a sandy clay loam subsoil. All these soils are eroded.

The permeability is moderate. The available water capacity is high, except for Alvin soils, which have a moderate available water capacity. Organic-matter content is

low. These soils are low in nitrogen and phosphorus and low to medium in potash.

These soils are suited to cultivated crops, hay, permanent pasture, trees, and wildlife habitat.

Management is needed to control erosion and maintain fertility and organic-matter content. Crops on these soils respond very well to fertilizers. Row crops can be grown more often where the soils are terraced or stripcropped and minimum tillage is practiced.

MANAGEMENT GROUP IIIe-3

This group consists of deep, moderately well drained, moderately sloping and strongly sloping soils of the Ava, Hosmer, and Grantsburg series. These soils are on uplands, and most of them are eroded. They have a silt loam surface layer, a silty clay loam subsoil, and a fragipan.

The soils of this group have moderate available water capacity and low organic-matter content. They are low in nitrogen and phosphorus and low to medium in potassium. The fragipan is at a depth of 24 to 36 inches. It is slowly permeable and restricts the movement of water and plant roots.

The soils of this group are suited to corn, soybeans, wheat, and hay. They also are suited to permanent pasture, trees, and wildlife habitat.

Management is needed to control erosion and maintain fertility and organic-matter content. Crops on these soils respond well to fertilizers.

MANAGEMENT GROUP IIIe-4

This group consists of deep, somewhat poorly drained, gently to moderately sloping soils of the McGary series. These soils are on terraces. They are eroded and have a silt loam surface layer and a silty clay to clay subsoil. Calcareous material occurs at a depth of 35 to 40 inches.

The permeability is very slow. The available water capacity is moderate, and the organic-matter content is low. These soils are low in phosphorus, potash, and nitrogen. The surface layer is slightly acid.

The soils of this unit are not well suited to cultivated row crops because they are somewhat droughty in summer. They are suited to wheat, hay, and pasture. Trees grow slowly on these soils.

Management is needed to control erosion. The soils have short slopes and are not suited to contouring. All crop residue should be returned to the soil to improve tilth and water infiltration and to control erosion. Fertilizers generally are needed for row crops, but the response to fertilizers is moderate.

MANAGEMENT GROUP IIIw-1

The group consists of deep, somewhat poorly drained to poorly drained, nearly level soils of the Cisne, Wynoose, Racoon, McGary, Sexton, and Chauncey series. These soils are on uplands and terraces. They have a silt loam surface layer and a silty clay loam to silty clay subsoil.

These soils are slowly to very slowly permeable. They have moderate to high available water capacity. A claypan in the subsoil of the Cisne, Wynoose, and McGary soils restricts the movement of plant roots and water. Organic-matter content is low to very low. These soils are low in nitrogen and phosphorus and low to medium in potassium.

These soils are suited to most of the crops commonly grown in the two counties, such as corn, soybeans, wheat, and red clover hay. They are also suited to pasture, woodland, and wildlife habitat.

Management is needed to drain the soils, maintain fertility and organic-matter content, improve soil tilth, and reduce surface crusting. Tile does not function satisfactorily, because these soils have slow to very slow permeability. A system of surface ditches provides adequate drainage if outlets are available.

Drought can be a hazard late in the growing season on the Cisne, Wynoose, and McGary soils because they have a claypan. Where soils are managed to improve fertility, plant roots can penetrate the claypan subsoil and draw upon a much larger volume of soil water (*8*).

MANAGEMENT GROUP IIIw-2

This group consists of deep, poorly drained to very poorly drained, nearly level soils of the Darwin, Bonnie, and Petrolia series. These soils are on bottom lands. The Bonnie soils are silt loam, the Petrolia soils are silty clay loam, and the Darwin soils are silty clay to clay.

Bonnie and Petrolia soils are low to very low in content of organic matter, nitrogen, phosphorus, and potassium, and Darwin soils are low to medium. Available water capacity is high.

Where adequately drained, these soils are suited to corn, soybeans, wheat, and other cultivated crops. They also are suited to pasture, woodland, and wildlife habitat.

Management is needed to control flooding, to drain the soils, and to maintain fertility, tilth, and organic-matter content. A system of surface ditches can be used. Tile drains do not function adequately, because permeability is slow to very slow. Soils that are subject to flooding can be used only for summer crops such as corn and soybeans. Flood control should be planned for an entire watershed, because levees are too expensive to install or are not sufficiently effective for single areas of these soils. In places, diversion ditches are needed to intercept runoff from higher soils.

Tilth can be improved and crusting can be reduced by returning all crop residue to the soil, by regularly growing crops for green manure, and by applying manure. Response to fertilizers is moderate.

MANAGEMENT GROUP IIIs-1

This group consists of deep, moderately well drained, nearly level to gently sloping soils of the Tamalco series. These soils are on uplands. They have a silt loam surface layer and silty clay loam subsoil. The gently sloping soils are eroded.

Permeability is slow to very slow, available water capacity is low to moderate, and organic-matter content is low. The content of nitrogen, phosphorus, and potassium is low.

Only under a very high level of management can summer crops such as corn and soybeans be grown on these soils. These soils are better suited to wheat and hay. They also are suited to pasture and wildlife habitat.

These soils occur mostly as small areas that are generally impractical to manage separately. These soils commonly are managed the same way as adjacent soils.

Management is needed to maintain fertility and organic-matter content, improve tilth, and control erosion. Sloping soils are very susceptible to erosion. Soils along drainageways have short slopes and are not suited to contouring. Soil tilth and organic-matter content can be improved by returning all crop residue to the soil and by regularly growing crops for green manure. Response to fertilizer is only fair because the soils have poor physical properties and contain a large amount of sodium in the lower part of the subsoil.

MANAGEMENT GROUP IVe-1

This group consists of deep, somewhat poorly drained, moderately to strongly sloping soils of the Hoyleton, Blair, Bluford, Stoy, and Robbs series. These soils are on uplands. They are eroded to severely eroded and have a silt loam surface layer and a silty clay loam subsoil. The severely eroded soils have a silty clay loam surface layer in places.

Organic-matter content is very low to low, permeability is slow, and the available water capacity is high. The content of nitrogen, phosphorus, and potassium is low.

These soils are suited to hay and pasture. Corn, soybeans, and wheat do not grow so well on the severely eroded soils as they do on the less eroded soils. These soils also are suited to trees and wildlife habitat.

Management is needed to control erosion, to maintain fertility and organic-matter content, and to improve tilth. Erosion is a severe hazard on cultivated soils. Slopes generally are short, and in most places the soils are not suited to contouring. Row crops should be grown only in areas where the soils can be contoured. A suitable cropping system is a small grain followed by several years of meadow crops to control erosion. Severely eroded soils have poor tilth. Tilth can be improved by growing grasses and legumes.

MANAGEMENT GROUP IVe-2

This group consists of deep, moderately well drained to well drained, strongly sloping to moderately steep soils of the Hickory series. These soils are on uplands. The strongly sloping soils are eroded, and the moderately steep soils are severely eroded. The surface layer is loam and the subsoil is clay loam. The surface layer of severely eroded soils is clay loam in places.

These soils have moderate permeability and high available water capacity. Organic-matter content is very low. These soils are low in nitrogen, phosphorus, and potassium.

The soils in this unit are suited to hay or pasture. Corn, soybeans, and wheat can be grown occasionally. These soils also are suited to permanent pasture, woodland, and wildlife habitat.

Management is needed to control erosion, maintain fertility and organic-matter content, and, in places, to improve soil tilth. Slopes generally are short, but the soils can be contoured and terraced in places. A suitable cropping system is a row crop followed by grasses and legumes. Where soils are stripcropped, row crops can be grown more often. Crops respond well to fertilizers.

MANAGEMENT GROUP IVe-3

This group consists of deep, moderately well drained to well drained, moderately sloping to moderately steep soils of the Ava, Hosmer, and Zanesville series. These soils are on uplands. They are eroded to severely eroded. The surface layer is silt loam or silty clay loam in places. The subsoil is silty clay loam and contains a fragipan. The growth of roots and the movement of water are somewhat restricted by the dense, compact fragipan that is at a depth of 22 to 30 inches.

These soils are slowly permeable. Available water capacity is moderate, and organic-matter content is low. The soils of this group are low in nitrogen and phosphorus and low to medium in potassium. Erosion is a severe hazard.

These soils are well suited to hay or pasture. Corn, soybeans, or wheat can be grown occasionally. These soils also are suited to trees and wildlife habitat.

Management is needed to control erosion, maintain fertility and organic-matter content, and improve tilth. Where slopes are short, contouring or similar practices are adequate to control erosion; terracing and contour stripcropping are required on longer slopes. Row crops should be contoured. Where contouring is not practical, a suitable cropping system is small grain followed for several years by grasses and legumes to control erosion. Crops on these soils respond well to fertilizers.

MANAGEMENT GROUP IVe-4

This group consists of deep, somewhat poorly drained and moderately well drained, moderately sloping soils of the McGary and Tamalco series. These soils are on uplands and terraces. They are severely eroded and have a silt loam to silty clay surface layer. The surface layer is slightly acid. Tamalco soils have a silty clay loam subsoil, and McGary soils have a silty clay to clay subsoil.

Permeability is slow to very low, organic-matter content is low, and available water capacity is low to moderate. The soils of this group are low in nitrogen, phosphorus, and potassium.

These soils are suited to hay and pasture. A small grain can be grown occasionally. These soils are not suited to trees.

Management is needed to control erosion, improve tilth, and maintain fertility and organic-matter content. These soils generally have short slopes that are not suited to contouring. Response to fertilizer is very limited because the soils have poor physical properties. Tilth is very poor. A suitable cropping system is a small grain followed by several years of meadow to control erosion. Small areas of these soils are managed the same way as larger areas of more productive adjacent soils.

MANAGEMENT GROUP IVw-1

This group consists of deep, poorly drained to somewhat poorly drained, nearly level to gently sloping soils of the Huey series. These soils are on uplands. They have a silt loam to silty clay loam surface layer and a silty clay loam subsoil. The subsoil has a high sodium content and is mildly alkaline to strongly alkaline. The gently sloping soils are eroded. Slopes generally are short.

Permeability is very slow; organic-matter content and available water capacity are low. These soils are low in

nitrogen, phosphorus, and potassium. The surface layer is slightly acid.

These soils are well suited to wheat. Summer crops, such as corn and soybeans, grow poorly. However, these soils generally occupy small areas within larger areas of more productive soils that are used for these crops. Huey soils are better suited to small grains and pasture. They are not well suited to trees or wildlife habitat.

Management is needed to improve tilth, maintain organic-matter content, reduce the sodium content, drain level soils, and control erosion on sloping soils. Small areas of these soils generally are cropped with adjacent soils, because it is impractical to farm them separately. Response to fertilizer is poor, because the soil characteristics are unfavorable. However, phosphorus and nitrogen fertilizer generally benefit wheat. Practices such as heavy manuring and working mulches into the soil improve soil tilth. These soils remain wet late in spring and need surface drainage.

Although corn yields can be increased by mixing gypsum deep into the subsoil to counteract the high sodium content, the cost of this treatment is usually not practical under current economic conditions (*7*).

MANAGEMENT GROUP VIe-1

This group consists of deep, somewhat poorly drained to well-drained, strongly sloping to steep soils of the Blair, Hickory, and Alford series. These soils are on uplands. The steep soils are eroded, and the strongly sloping to moderately steep soils are severely eroded. The surface layer of the Blair and Hickory soils is loam to clay loam, and the subsoil is silty clay loam to clay loam. The Alford soils have a silt loam to silty clay loam surface layer and a silty clay loam subsoil.

The soils in this group are slowly to moderately permeable and have moderate to high available water capacity. In places water runoff is rapid and the water intake rate is slow. Organic-matter content is low to very low. Soils of this group are low in nitrogen and low to medium in phosphorus and potassium.

These soils are better suited to pasture or woodland than to crops. In most areas, slopes are greater than 18 percent. Where slopes are too steep to permit use of farm machinery, the soils are suited only to trees.

Where used for crops and pasture, management is needed to reduce runoff, control erosion, and maintain fertility. Response to fertilizers is good.

MANAGEMENT GROUP VIe-2

This group consists of deep, moderately well drained to well drained, strongly sloping to moderately steep soils of the Zanesville series. These soils are on uplands. The moderately steep soils are eroded, and the strongly sloping soils are severely eroded. They have a silt loam to silty clay loam surface layer and a silty clay loam subsoil that contains a fragipan. Depth to sandstone bedrock is generally 3 to 6 feet.

The soils of this group have moderate available water capacity, low organic-matter content, and slow permeability. They are low in nitrogen, phosphorus, and potassium.

These soils are suited to pasture, trees, and wildlife habitat. A small grain can be grown occasionally. Stands of grasses and legumes are more difficult to establish on the severely eroded soils in this group than on the less eroded soils.

Management is needed to control erosion, reduce droughtiness, improve tilth, and maintain fertility and organic-matter content. Response to fertilizers is good.

MANAGEMENT GROUP VIe-3

Only Huey soils, 2 to 7 percent slopes, severely eroded, are in this group. These are deep, poorly drained and somewhat poorly drained, gently to moderately sloping soils on uplands. They have a silt loam to silty clay loam surface layer and a silty clay loam subsoil. The surface layer is slightly acid. These soils have very poor physical properties because they have a high content of sodium.

Available water capacity and organic-matter content are low. These soils are low in nitrogen, phosphorus, and potassium.

Management is needed to control erosion, improve tilth, maintain fertility, drain wet soils, reduce droughtiness, and leach sodium. Where alkalinity is not too high, these soils can be used for pasture. Where alkalinity is high, vegetation is difficult to establish. No practical way of removing sodium from the soil is available. These soils should be seeded to grasses and legumes, and highly alkaline spots should be treated with manure to improve tilth. Careful management is needed to establish and maintain stands of grasses and legumes. Response to fertilizer generally is poor. These soils generally are not suited to trees.

MANAGEMENT GROUP VIs-1

This group consists of moderately deep, well-drained, strongly sloping to moderately steep soils of the Wellston series. These soils are on uplands. The moderately steep soils are eroded, and the strongly sloping soils are severely eroded. The surface layer generally is silt loam. It is silty clay loam in some severely eroded soils. The subsoil is silty clay loam.

Organic-matter content is low and the available water capacity is moderate. Permeability is moderate. The soils of this group are low in nitrogen, phosphorus, and potassium.

These soils are suited to pasture, trees, and wildlife habitat.

Management is needed to control erosion, maintain fertility and organic-matter content, reduce droughtiness, and improve tilth. Pasture is difficult to establish on the severely eroded soils in this group and requires large amounts of fertilizer. Response to fertilizer is limited because the available water capacity is moderate.

MANAGEMENT GROUP VIIs-1

This group consists of moderately deep, well-drained, moderately steep to steep soils of the Wellston series. These soils are on uplands. The steep soils are eroded, and the moderately steep soils are severely eroded. The surface layer is silt loam to silty clay loam, and the subsoil is silty clay loam.

These soils have moderate permeability and available water capacity and low organic-matter content. They are low in nitrogen, phosphorus, and potassium.

These soils are suited to trees. Some cleared areas are suitable for pasture if grazing is controlled. Wooded areas should not be cleared for pasture.

Where these soils are used for pasture, management is needed to control erosion, maintain fertility, and reduce droughtiness.

MANAGEMENT GROUP VIIs-2

Only Shale rock land is in this group. This land type is strongly sloping to steep and shallow to very shallow. It occurs along the bluffs of drainageways on uplands. This land type consists mostly of shale, but in small areas there is a developed soil not more than 24 inches deep to shale bedrock.

Permeability varies, but generally it is slow. Available water capacity also varies, but generally it is low. Natural fertility is low. Most eroded soils are wooded, but severely eroded soils normally are bare.

Plant cover is needed on this land. Trees are suitable, though they are difficult to establish. Erosion is a serious hazard. Rock fragments on the surface limit the use of this land.

Estimated Yields

Table 5 shows estimated yields of the principal crops grown in Edwards and Richland Counties under a high level of management. These estimates are based on yields for the period 1954 to 1963, on soil tests, and on the experience and records of farmers, agronomists, conservationists, and farm advisers (*21*). The estimates are adjusted to reflect the trend toward higher yields during the period 1963 to 1968. Average yields are expected to increase. A few farmers obtain yields as high as 200 bushels of corn an acre in some years, but yields this high are still uncommon.

Management was determined on the basis of farming techniques, crop varieties, and fertilizers commonly used in 1968. Differences in weather from year to year may cause annual yields to range 20 percent above or below the long-term estimates shown in the table. Hay and pasture yields are estimated for varieties of grasses and legumes adapted to the soil.

Under high-level management, adequate drainage, flood control, and erosion control are provided; the proper number of plants is grown; high-quality seed is used; tillage is kept to a minimum and is done when soil moisture is favorable; weeds, plant diseases, and harmful insects are controlled; favorable soil reaction and near optimum levels of nitrogen, phosphorus, and potassium are maintained; efficient use is made of available crop residue, barnyard manure, and green-manure crops; crops are harvested with the smallest possible loss; the combination of practices used is efficient; and all operations are timely.

TABLE 5.—*Estimated average acre yields of principal crops*

[Yields are those to be expected under a high level of management. Absence of a yield figure indicates that the soil is not well suited to the crop or that the crop is not commonly grown. Shale rock land is not rated]

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Rotation pasture
	Bu.	*Bu.*	*Bu.*	*Tons*	*Animal unit days* [2]
Alford silt loam, 2 to 4 percent slopes	110	38	48	4.8	240
Alford silt loam, 4 to 7 percent slopes, eroded	105	35	45	4.5	225
Alford silt loam, 7 to 16 percent slopes, eroded	100	35	42	4.2	225
Alford silt loam, 18 to 30 percent slopes, eroded				4.0	200
Allison silty clay loam	120	40	44	5.0	260
Alvin fine sandy loam, 1 to 4 percent slopes	80	30	38	3.5	175
Alvin fine sandy loam, 4 to 12 percent slopes, eroded	70	28	35	3.2	160
Ava silt loam, 2 to 4 percent slopes	90	30	40	3.8	190
Ava silt loam, 2 to 4 percent slopes, eroded	80	28	35	3.5	185
Ava silt loam, 4 to 7 percent slopes	90	30	40	3.8	190
Ava silt loam, 4 to 7 percent slopes, eroded	80	28	34	3.4	175
Ava silt loam, 7 to 12 percent slopes, eroded	75	25	35	3.2	160
Ava soils, 4 to 7 percent slopes, severely eroded	60	22	30	2.8	140
Belknap silt loam	105	38	48	4.5	225
Blair silt loam, 4 to 7 percent slopes, eroded	70	25	32	3.0	150
Blair silt loam, 7 to 12 percent slopes, eroded	65	22	30	2.8	140
Blair soils, 4 to 7 percent slopes, severely eroded	55	20	28	2.5	125
Blair soils, 7 to 12 percent slopes, severely eroded	50		25	2.2	110
Bluford silt loam, 0 to 2 percent slopes	95	32	42	3.8	190
Bluford silt loam, 2 to 4 percent slopes	95	32	42	3.8	190
Bluford silt loam, 2 to 4 percent slopes, eroded	85	28	38	3.5	175
Bluford silt loam, 4 to 7 percent slopes, eroded	65	24	30	2.8	140
Bonnie silt loam	90	32	40	3.8	190
Camden silt loam, 0 to 2 percent slopes	110	40	48	5.0	250
Camden silt loam, 2 to 7 percent slopes	105	35	45	4.8	240
Chauncey silt loam	105	36	48	4.5	225
Cisne silt loam	105	38	48	4.2	210
Coffeen silt loam	120	40	50	5.0	250
Darwin silty clay	90	32	38	3.0	150
Ebbert silt loam	115	40	50	4.5	225
Grantsburg silt loam, 2 to 4 percent slopes	75	30	38	3.4	170

See footnotes at end of table.

TABLE 5.—*Estimated average acre yields of principal crops*—Continued

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Rotation pasture
	Bu.	*Bu.*	*Bu.*	*Tons*	*Animal unit days* [2]
Grantsburg silt loam, 4 to 7 percent slopes	72	28	35	3.4	170
Grantsburg silt loam, 4 to 7 percent slopes, eroded	70	25	32	3.2	160
Hickory loam, 7 to 12 percent slopes, eroded	85	30	38	3.8	190
Hickory loam, 12 to 18 percent, slopes eroded	80			3.5	175
Hickory loam, 18 to 30 percent slopes, eroded				3.5	175
Hickory soils, 7 to 12 percent slopes, severely eroded	60	25	30	3.4	175
Hickory soils, 12 to 30 percent slopes, severely eroded			14	3.5	175
Hosmer silt loam, 2 to 4 percent slopes	90	30	40	3.8	190
Hosmer silt loam, 4 to 7 percent slopes, eroded	80	30	38	3.8	190
Hosmer silt loam, 7 to 12 percent slopes, eroded	75	28	35	3.8	190
Hosmer silt loam, 12 to 18 percent slopes, eroded	65			3.5	170
Hosmer soils, 7 to 12 percent slopes, severely eroded	60		28	3.5	175
Hoyleton silt loam, 0 to 2 percent slopes	105	39	48	4.5	225
Hoyleton silt loam, 2 to 4 percent slopes	105	39	48	4.5	225
Hoyleton silt loam, 2 to 4 percent slopes, eroded	100	35	45	4.2	210
Hoyleton silt loam, 4 to 7 percent slopes	90	33	40	3.8	190
Huey silt loam, 0 to 2 percent slopes	55	20	30	2.2	110
Huey silt loam, 2 to 4 percent slopes, eroded	40	15	25	1.8	90
Huey soils, 2 to 7 percent slopes, severely eroded			18	1.0	50
Lukin silt loam	110	38	48	4.8	240
Marissa silt loam	115	40	50	4.8	240
McGary silt loam, 0 to 2 percent slopes	80	28	38	3.2	160
McGary silt loam, 2 to 4 percent slopes, eroded	75	28	35	3.0	150
McGary silt loam, 4 to 10 percent slopes, eroded	70	25	32	2.8	140
McGary soils, 4 to 10 percent slopes, severely eroded			15	1.8	90
Montgomery silty clay	110	38	42	4.5	225
Newberry silt loam	110	37	48	4.2	210
Patton silty clay loam	125	45	50	5.0	250
Petrolia silty clay loam	110	38	45	4.2	210
Racoon silt loam	90	32	42	3.8	190
Reesville silt loam, 0 to 2 percent slopes	115	40	50	4.8	240
Reesville silt loam, 2 to 4 percent slopes	110	38	48	4.6	230
Reesville silt loam, 4 to 7 percent slopes, eroded	100	35	42	4.5	225
Richview silt loam, 2 to 4 percent slopes	100	35	45	4.5	225
Richview silt loam, 4 to 7 percent slopes, eroded	90	33	40	4.0	200
Robbs silt loam, 1 to 4 percent slopes	85	28	38	3.5	175
Robbs silt loam, 4 to 7 percent slopes, eroded	65	24	34	2.7	140
Sexton silt loam	100	35	45	4.0	200
Sharon silt loam	110	38	48	4.5	225
Stoy silt loam, 0 to 2 percent slopes	100	35	45	4.2	210
Stoy silt loam, 2 to 4 percent slopes	100	35	45	4.2	210
Stoy silt loam, 4 to 7 percent slopes, eroded	70	30	40	3.5	150
Tamalco silt loam, 0 to 2 percent slopes	60	20	30	2.5	125
Tamalco silt loam, 2 to 4 percent slopes, eroded	55	18	28	2.2	110
Tamalco soils, 3 to 7 percent slopes, severely eroded	40	15	20	1.8	90
Wakeland silt loam	115	40	50	4.8	240
Wellston silt loam, 12 to 18 percent slopes, eroded	65		25	3.5	175
Wellston silt loam, 18 to 30 percent slopes, eroded				3.0	150
Wellston soils, 7 to 12 percent slopes, severely eroded	65	30	30	3.2	160
Wellston soils, 12 to 30 percent slopes, severely eroded				3.0	150
Wynoose silt loam	85	28	38	3.5	175
Zanesville silt loam, 7 to 12 percent slopes, eroded	85	30	38	3.8	175
Zanesville silt loam, 12 to 18 percent slopes, eroded	80		35	3.5	175
Zanesville soils, 7 to 12 percent slopes, severely eroded	80		35	3.2	160

[1] Hay and pasture yields are estimated for mixed stands of grasses and legumes that are adapted to the soil.

[2] Animal unit days is a term used to express the carrying capacity of pasture. It is the number of days 1 acre can carry 1 animal unit during a single grazing season without injury to the sod. One animal unit is defined as 1 cow, 2 yearling calves, 1 horse, 5 sheep, or 4 brood sows. For example, 20 sheep can graze about 25 days in a pasture that has a capacity of 100 animal unit days.

Woodland [3]

About 80 percent of Edwards County and 65 percent of Richland County was once forested. Most of the forest has been cleared. In 1962, only 19,700 acres in Edwards County and 37,600 acres in Richland County were still in trees (*14*). Oak, hickory, and associated hardwoods are the main species, and white oak is the most common tree in both counties.

Because most soils were cleared for crops, the remaining stands are mainly on soils that are unsuitable for cultivation. These soils generally are steep, wet, or inaccessible. The largest continuous stands are on Bonnie and Petrolia soils in the valleys of the Fox and Little Wabash Rivers. Wooded areas on uplands generally are not more than 80 acres in size and consist mainly of steep Hickory loam soils. Wooded areas on uplands commonly are grazed. Wooded areas in the larger bottom lands generally are not grazed, but they are frequently damaged by fire.

Small sawmills in both counties process the trees for commercial use. Where not used commercially, the woodland provides valuable watershed protection, wildlife cover, and recreational areas.

In table 6 the soils of Edwards and Richland Counties are placed in ten woodland suitability groups. Each group consists of soils that have about the same suitability for trees, require about the same management, and have about the same potential productivity. Soils of the Chauncey, Cisne, Ebbert, Hoyleton, Huey, Lukin, Marissa, Montgomery, Newberry, Patton, Richview, and Tamalco series were not placed in woodland suitability groups, because they are not considered important for the production of trees.

In table 6, productivity for each species is given as a site index, and the average annual growth per acre in board feet is estimated.

Site index is the average height in feet the dominant and codominant trees of a given species will attain on the soils at maturity. Oak is rated at age 50 (*15*), other hardwoods at age 60, and cottonwood at age 30 (*4*). The site indexes listed in table 6 were determined by foresters and woodland conservationists from measurements made in Edwards and Richland Counties and in several counties nearby.

The estimated average annual growth per acre is given in board feet measured by the Doyle Rule. The estimates are based on data from well-stocked, well-managed stands of red oak, white oak, sweetgum, tulip-poplar, and cottonwood trees (*13*, *15*). Red oak and white oak were used to estimate the rate of growth for all upland oaks.

Four limitations and hazards that affect the growth of trees are rated in table 6. The ratings are slight, moderate, or severe for the soils in each group.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site where openings are made in the canopy. *Slight* means that competition is not a major problem. *Moderate* means that plant competition develops, but it does not prevent the establishment of desirable species and it can be controlled easily. *Severe* means that stands of desired species are not restocked naturally and that planted trees may be choked out unless intensive management is applied to eliminate competing plants.

Equipment limitation refers to soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees. *Slight* means that there is little or no restriction on the type of equipment or time of year that it can be used. *Moderate* means that use of equipment is restricted because of steep slopes or because soils are wet for 3 months or less each year. *Severe* indicates that the very steep slopes make special harvesting methods necessary, or that use of equipment is restricted because the soils are wet for more than 3 months each year.

Seedling mortality refers to the expected loss of natural or planted tree seedlings caused by soil characteristics and topographic features, excluding losses caused by plant competition. It is assumed that the natural supply of seed is adequate, that the stock is good, that seedlings are properly planted and cared for, and that climatic conditions are normal. *Slight* means that losses normally are not more than 25 percent of the planted or natural stock; *moderate* means that losses are between 25 and 50 percent; and *severe* means that more than half of the planted or natural stock is likely to die.

Erosion hazard refers to the risk of erosion in properly managed stands. The length and steepness of slopes and the soil textures and permeability are among the factors considered. *Slight* means that erosion is not a major problem. *Moderate* means that management is needed to prevent erosion during harvesting operations and in cleared areas. *Severe* means that intensive management is required to control erosion.

Windthrow is not a hazard on most of the soils in table 6. The windthrow hazard is moderate on Wynoose soils in group 3 and Shale rock land in group 10. On these soils, roots develop enough to stabilize the tree, except when the soils are very wet or winds are very strong.

Table 6 lists, for each woodland suitability group, tree species to favor in natural stands. The ratings are based on the suitability of the species for the site and the market value of the trees. Species are not listed in order of preference. The table also lists trees to plant on soils that are not severely eroded and on soils that are severely eroded.

Pine trees, especially loblolly and shortleaf pine, generally are better suited to severely eroded areas than hardwoods. Pine trees planted on these sites can be harvested for pulpwood after a period of about 25 years. During this period, hardwoods can regenerate naturally and then will take over the site as the pine trees are cleared.

Scotch pine is planted primarily for use as Christmas trees on the soils in groups 4 through 9.

Black locust is suitable for planting in gullied areas. The locust borer is a severe hazard, however, and few trees will attain maturity in sound condition. Locust trees are planted mainly as a soil builder and as nurse trees for other hardwoods interplanted with them (*10*).

[3] By CLARK RINKER, woodland conservationist, Soil Conservation Service, WILLIAM R. BOGGESS, Department of Forestry, University of Illinois, and RICHARD THOM, district forester, Illinois Department of Conservation.

TABLE 6.—*Woodland*

Woodland suitability groups	Potential soil productivity		
	Species	Site index [1]	Annual growth per acre [2]
			Board feet
Group 1: Deep, somewhat poorly drained to well-drained, nearly level, moderately permeable to moderately slowly permeable soils that have a silt loam to silty clay loam surface layer and subsoil; on bottom lands. Allison (306), Belknap (382), Coffeen (428), Sharon (72), Wakeland (333).	Cottonwood Tulip-poplar Pin oak Sweetgum	95–105 85–95 85–95 85–95	450–550 450–550 350–450 450–550
Group 2: Deep, poorly drained and very poorly drained, nearly level, moderately slowly to very slowly permeable soils that have a silt loam to silty clay surface layer and subsoil; on bottom lands. Bonnie (108), Darwin (71), Petrolia (288).	Pin oak Cottonwood	85–95 95–105	350–450 450–550
Group 3: Deep, poorly drained, nearly level, slowly permeable to very slowly permeable soils that have a silt loam surface layer and a silty clay loam to silty clay subsoil; on terraces and uplands. Racoon (109), Sexton (208), Wynoose (12).	Upland oaks [4] Pin oak Sweetgum	65–75 75–85 75–85	150–250 200–300 340–440
Group 4: Deep, somewhat poorly drained, nearly level to strongly sloping, slowly permeable to moderately slowly permeable soils that have a silt loam surface layer and a silty clay loam to clay loam subsoil; on uplands and terraces. Blair (5C2, 5C3, 5D2, 5D3), Bluford (13A, 13B, 13B2, 13C2), Reesville (723A, 723B, 723C2), Robbs (335B, 335C2), Stoy (164A, 164B, 164C2).	Upland oaks [4] Sweetgum	75–85 85–95	200–350 450–550
Group 5: Deep, somewhat poorly drained, nearly level to moderately sloping, very slowly permeable soils that have a silt loam surface layer, a silty clay subsoil, and calcareous clay substrata; on terraces. McGary (173A, 173B2, 173C2, 173C3).	Upland oaks [4]	65–75	150–250
Group 6: Deep, moderately well drained, gently sloping to moderately steep, slowly permeable soils that have a silt loam surface layer, a silty clay loam subsoil, and a silty fragipan; on uplands. Ava (14B, 14B2, 14C, 14C2, 14C3, 14D2), Grantsburg (301B, 301C, 301C2), Hosmer (214B, 214C2, 214D2, 214D3, 214E2), Zanesville (340D2, 340D3, 340E2).	Upland oaks [4]	52–75	100–250
Group 7: Deep, moderately well drained to well drained, nearly level to moderately steep, moderately permeable soils that have a silt loam to fine sandy loam surface layer and a silty clay loam to sandy clay loam subsoil; on uplands and terraces. Alford (308B, 308C2, 303D2), Alvin (131B, 131C2), Camden (134A, 134B), Hickory (8D2, 8D3, 8E2).	Upland oaks [4] Tulip-poplar Sweetgum	85–95 95–105 95–105	350–450 550–650 550–650
Group 8: Deep, moderately well drained to well drained, moderately steep to steep, moderately permeable soils that have a variable textured surface layer and subsoil; on uplands. Alford (303F2), Hickory (8E3, 8F2).	Upland oaks [4] Tulip-poplar	85–95 95–105	350–450 550–650

See footnotes at end of table.

suitability of soils

Management limitations and hazards				Species suitability		
					Use for planting on—	
Plant competition	Equipment limitation	Seedling mortality	Erosion hazard	Favor in natural stands	Not severely eroded soils	Severely eroded soils
Moderate to severe.	Slight	Slight	Slight	Cottonwood, sycamore, tulip-poplar, bottom-land oaks,[3] sweetgum, ash, pecan, and soft maple.	Tulip-poplar, cottonwood, sycamore, soft maple, pin oak, walnut, and sweetgum.	No soil in this group is severely eroded.
Severe	Moderate on wet soils.	Moderate to severe.	Slight	Cottonwood, sweetgum, ash, sycamore, bottom-land oaks,[3] pecan, and soft maple.	Pin oak, cotton-wood, sycamore, sweetgum, cypress, and soft maple.	No soil in this group is severely eroded.
Severe	Moderate	Moderate	Slight	White oak, red oak, pin oak, ash, black walnut, cotton-wood, and black oak.	Pin oak, cypress, red maple, and water tupelo.	No soil in this group is severely eroded.
Moderate to severe.	Slight	Slight	Slight to moderate.	White oak, red oak, bur oak, ash, sweetgum, and black oak.	White oak, red oak, ash, white pine, and Scotch pine.	White pine and Scotch pine.
Moderate	Slight	Slight to mod-erate on slightly to moderately eroded soils; severe on severely eroded soils.	Slight to severe.	White oak, pin oak, sweetgum, and black oak.	Pin oak, Scotch pine, and red-cedar.[5]	Scotch pine and redcedar.[5]
Slight on severely eroded soils; moderate on slightly to moderately eroded soils.	Slight to moderate.	Slight on slightly to moderately eroded soils; moderate on severely eroded soils.	Slight to moderate.	White oak, red oak, ash, walnut, tu-lip-poplar, and black oak.	White oak, red oak, ash, loblolly pine, Scotch pine, and white pine.	Loblolly pine, white pine, Scotch pine, and redcedar.[5]
Moderate	Slight to moderate.	Slight	Slight to moderate.	White oak, red oak, tulip-poplar, wal-nut, ash, sweet-gum, and black cherry.	White oak, red oak, ash, walnut, tulip-poplar, loblolly pine, Scotch pine, and white pine.	Loblolly pine, Scotch pine, white pine, and black locust.
Moderate	Moderate	Slight	Moderate	White oak, tulip-poplar, red oak, walnut, ash, black cherry, and sweet-gum.	Loblolly pine, white pine, tulip-poplar, walnut, white oak, ash, and Scotch pine.	Loblolly pine, Scotch pine, and black locust.

TABLE 6.—*Woodland*

Woodland suitability groups	Potential soil productivity		
	Species	Site index [1]	Annual growth per acre [2]
			Board feet
Group 9: Moderately deep, well-drained, strongly sloping to steep, moderately permeable soils that have a silt loam surface layer and a silty clay loam subsoil; on uplands. Wellston (339D3, 339E2, 339E3, 339F2).	Upland oaks [4]	75–85	250–350
Group 10: Very shallow to shallow, steep, eroded to severely eroded soils that are underlain by shale; on uplands. Shale rock land (95).	Upland oaks [4]	45–54	50–100

[1] The method for establishing "Range of Site Index" is described in the narrative accompanying this table.
[2] Doyle Rule *(15)*.
[3] Bottom-land oaks include swamp white oak and cherrybark oak.

Wildlife [4]

Food, cover, and water are plentiful in Edwards and Richland Counties, but not always in combinations suitable for wildlife habitat (*23*). The three major kinds of wildlife in the two counties are openland, woodland, and wetland wildlife. The soils have greater potential for development as habitat for openland and woodland wildlife than for wetland wildlife.

In table 7, the suitability of each soil in the two counties is rated for elements of wildlife habitat and for kinds of wildlife. The eight elements of wildlife habitat and the kinds of wildlife shown in table 7 are defined in the following paragraphs.

Grain and seed crops.—These are domestic grains or seed-producing annual plants that include such crops as corn, sorghum, wheat, oats, soybeans, buckwheat, cowpeas, and sunflower.

Grasses and legumes.—These are domestic perennial grasses and herbaceous legumes that include such crops as brome, fescue, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoil, alfalfa, and sericea and Korean lespedezas.

Wild herbaceous plants.—These are native or introduced perennial grasses and forbs or weeds that provide food and cover principally for upland wildlife. These plants include bluestem, indiangrass, wheatgrass, wildrye, oatgrass, pokeweed, strawberries, lespedezas, beggarweed, wild beans, nightshade, and goldenrod.

Hardwood plants.—These are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs (browse), or foliage used extensively as food by wildlife. These plants, commonly established by natural processes but also planted, include oak, beech, cherry, hawthorn, dogwood, viburnum, holly, maple, birch, poplar, grape, honeysuckle, blueberry, brier, greenbrier, and rose.

Coniferous plants.—These are cone-bearing trees and shrubs, primarily used by wildlife as cover. Food in the form of browse, seeds, or fruitlike cones is used some by wildlife. These plants, established naturally or by planting, include pine, spruce, white-cedar, redcedar, hemlock, balsam fir, juniper, and yew.

Wetland plants.—These are annual and perennial wild herbaceous plants, excluding submerged or floating aquatic plants that grow on moist or wet sites. These plants, used mainly by wetland wildlife for food and cover, include smartweed, wild millet, rushes, sedges, reeds, wildrice, rice cutgrass, mannagrass, bluejoint, cordgrass, cattail, pondweed, wild celery, and spatterdock.

Shallow water impoundments.—These are impoundments or excavations generally not more than 5 feet deep. Examples are low dikes and levees, shallow dugouts, level ditches, and installations for controlling the water level on marshy streams or channels.

Excavated ponds.—These are dugout areas or combinations of dugouts and low dikes that have water of suitable quality, of suitable depth, and in adequate amounts for fish or wildlife. An excavated pond has a surface area of at least 1/10 acre. It is 6 feet deep in at least one quarter of the area, and it has a dependable high water table or other source of unpolluted water. Soils are not rated for impounded farm ponds in table 7. However, this type of pond attracts migratory waterfowl and can be used for fresh-water fish (fig. 11). The suitability of soils for impounded farm ponds is rated in the section "Engineering Uses of the Soils."

Openland wildlife.—Included are quail, mourning dove, meadowlark, cottontail rabbit, red fox, and other birds and mammals. They normally live on cropland, pastures, hayland, and other areas overgrown with grasses, herbs, and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are seed and grain crops, grasses and legumes, wild herbaceous upland plants, and hardwood woodland plants.

Woodland wildlife.—Included are squirrel, white-tailed deer, raccoon, woodcock, woodpecker, nuthatches, and other birds and mammals that frequent wooded areas consisting of hardwood and coniferous trees and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous

[4] By REX HAMILTON, biologist, Soil Conservation Service.

suitability of soils—Continued

Management limitations and hazards				Species suitability		
					Use for planting on—	
Plant competition	Equipment limitation	Seedling mortality	Erosion hazard	Favor in natural stands	Not severely eroded soils	Severely eroded soils
Slight	Moderate	Slight to moderate.	Moderate	White oak, red oak, ash, and black oak.	Loblolly pine, redcedar,[5] white pine, and Scotch pine.	Redcedar [5] and loblolly pine.
Slight	Moderate to severe.	Severe	Severe	Red oak, white oak, and black oak.	Redcedar [5]	Black locust.

[4] Upland oaks include white oak, red oak, bur oak, and black oak.
[5] Planted redcedar has been disappointing in terms of growth and shape in this area; naturally seeded redcedar appears to be very good.

upland plants, hardwood woodland plants, and coniferous woodland plants.

Wetland wildlife.—Included are various kinds of waterfowl, muskrat, kingfisher, red-winged blackbird, and other birds and mammals that normally live in wet areas such as ponds, marshes, and swamps. Wildlife habitat elements used to rate the soils for this kind of wildlife are grain and seed crops, wetland food and cover plants, shallow water developments, and excavated ponds.

Recreational Uses of the Soils

In table 8, the soils of Edwards and Richland Counties are placed in recreation groups, and are rated according to their limitations for recreational uses. The ratings for the soils in each group are based on soil characteristics that affect use, such as natural drainage, seasonal high water table, flooding hazard, permeability, slope, texture of the surface layer, depth to hard bedrock, and stoniness or rockiness.

***Figure 11.*—Pond suitable for wildlife habitat and recreational uses constructed in a drainageway on Blair soils.**

The ratings are *slight*, *moderate*, or *severe*. A rating of slight means that the soil has few or no limitations for the use specified, or that the limitations can be easily overcome. A rating of moderate indicates that the limitations can be overcome by careful planning and maintenance. A rating of severe indicates that the soil is poorly suited to the use specified, or that the limitations can only be overcome by intensive engineering practices requiring a large investment. The soil properties that determine moderate and severe limitations are mentioned with the ratings in table 8. The recreational uses given in the table are discussed in the following paragraphs.

Cottages and utility buildings.—These buildings include cottages, washrooms and bathrooms, picnic shelters, and service buildings that are used seasonally or all year. The ratings are based mainly on soil features that contribute to the adequate support of these buildings. Additional information on soil limitations for septic tank filter fields is given in the section "Engineering Uses of the Soils."

Campsites.—These are areas suitable for tents and trailers and for living outdoors for a period of 1 week or more. Little site preparation should be required. The soils are rated according to their limitations for unsurfaced parking areas for cars and camp trailers and for heavy traffic by people, horses, and small vehicles such as bicycles.

Picnic areas.—Soils used for picnic areas need to support intensive foot traffic. Features that affect the desirability of a site, such as trees or ponds, are not considered in the ratings.

Playgrounds.—These areas are developed for intensive play and for organized games such as baseball, football, and tennis. They are subject to intensive foot traffic.

Paths and trails.—Soils used for paths and trails need to support intensive traffic of people on foot or on horseback. Little preparation should be needed. Paths and trails on sloping soils should be contoured to control erosion.

Golf fairways.—The soils are rated only according to their limitations for fairways. Greens, traps, and hazards generally are made from transported soil material. Soils

TABLE 7.—*Suitability*

Soil	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood plants
Alford silt loam, 2 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Alford silt loam, 4 to 7 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Alford silt loam, 7 to 16 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Alford silt loam, 18 to 30 percent slopes, eroded	Unsuited	Suited	Well suited	Well suited
Allison silty clay loam	Suited	Well suited	Well suited	Well suited
Alvin fine sandy loam, 1 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Alvin fine sandy loam, 4 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Ava silt loam, 2 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Ava silt loam, 2 to 4 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Ava silt loam, 4 to 7 percent slopes	Well suited	Well suited	Well suited	Well suited
Ava silt loam, 4 to 7 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Ava silt loam, 7 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Ava soils, 4 to 7 percent slopes, severely eroded	Suited	Suited	Well suited	Well suited
Belknap silt loam	Suited	Suited	Well suited	Well suited
Blair silt loam, 4 to 7 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Blair silt loam, 7 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Blair soils, 4 to 7 percent slopes, severely eroded	Suited	Well suited	Well suited	Well suited
Blair soils, 7 to 12 percent slopes, severely eroded	Suited	Suited	Well suited	Well suited
Bluford silt loam, 0 to 2 percent slopes	Suited	Suited	Well suited	Well suited
Bluford silt loam, 2 to 4 percent slopes	Suited	Suited	Well suited	Well suited
Bluford silt loam, 2 to 4 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Bluford silt loam, 4 to 7 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Bonnie silt loam	Poorly suited	Suited	Suited	Well suited
Camden silt loam, 0 to 2 percent slopes	Well suited	Well suited	Well suited	Well suited
Camden silt loam, 2 to 7 percent slopes	Well suited	Well suited	Well suited	Well suited
Chauncey silt loam	Poorly suited	Suited	Suited	Well suited
Cisne silt loam	Poorly suited	Suited	Suited	Well suited
Coffeen silt loam	Suited	Suited	Well suited	Well suited
Darwin silty clay	Unsuited	Poorly suited	Poorly suited	Well suited
Ebbert silt loam	Poorly suited	Poorly suited	Suited	Well suited
Grantsburg silt loam, 2 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Grantsburg silt loam, 4 to 7 percent slopes	Well suited	Well suited	Well suited	Well suited
Grantsburg silt loam, 4 to 7 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Hickory loam, 7 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Hickory loam, 12 to 18 percent slopes, eroded	Poorly suited	Suited	Well suited	Well suited
Hickory loam, 18 to 30 percent slopes, eroded	Unsuited	Suited	Well suited	Well suited
Hickory soils, 7 to 12 percent slopes, severely eroded	Suited	Well suited	Well suited	Well suited
Hickory soils, 12 to 30 percent slopes, severely eroded	Poorly suited	Suited	Well suited	Well suited
Hosmer silt loam, 2 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Hosmer silt loam, 4 to 7 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Hosmer silt loam, 7 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Hosmer silt loam, 12 to 18 percent slopes, eroded	Poorly suited	Suited	Well suited	Well suited
Hosmer soils, 7 to 12 percent slopes, severely eroded	Suited	Well suited	Well suited	Well suited
Hoyleton silt loam, 0 to 2 percent slopes	Suited	Suited	Well suited	Well suited
Hoyleton silt loam, 2 to 4 percent slopes	Suited	Suited	Well suited	Well suited
Hoyleton silt loam, 2 to 4 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Hoyleton silt loam, 4 to 7 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Huey silt loam, 0 to 2 percent slopes	Poorly suited	Suited	Suited	Suited
Huey silt loam, 2 to 4 percent slopes, eroded	Poorly suited	Suited	Suited	Suited
Huey soils, 2 to 7 percent slopes, severely eroded	Poorly suited	Suited	Suited	Suited
Lukin silt loam	Suited	Suited	Well suited	Well suited
Marissa silt loam	Suited	Suited	Well suited	Well suited
McGary silt loam, 0 to 2 percent slopes	Suited	Suited	Well suited	Well suited
McGary silt loam, 2 to 4 percent slopes, eroded	Suited	Suited	Well suited	Well suited
McGary silt loam, 4 to 10 percent slopes, eroded	Poorly suited	Suited	Well suited	Well suited
McGary soils, 4 to 10 percent slopes, severely eroded	Poorly suited	Suited	Well suited	Well suited
Montgomery silty clay	Unsuited	Poorly suited	Poorly suited	Well suited
Newberry silt loam	Poorly suited	Poorly suited	Suited	Well suited
Patton silty clay loam	Unsuited	Poorly suited	Poorly suited	Well suited
Petrolia silty clay loam	Poorly suited	Suited	Suited	Well suited
Racoon silt loam	Poorly suited	Suited	Suited	Well suited
Reesville silt loam, 0 to 2 percent slopes	Suited	Suited	Well suited	Well suited
Reesville silt loam, 2 to 4 percent slopes	Suited	Suited	Well suited	Well suited
Reesville silt loam, 4 to 7 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Richview silt loam, 2 to 4 percent slopes	Well suited	Well suited	Well suited	Well suited
Richview silt loam, 4 to 7 percent slopes, eroded	Well suited	Well suited	Well suited	Well suited
Robbs silt loam, 1 to 4 percent slopes	Suited	Suited	Well suited	Well suited
Robbs silt loam, 4 to 7 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Sexton silt loam	Poorly suited	Suited	Suited	Well suited
Shale rock land	Unsuited	Unsuited	Poorly suited	Poorly suited

of soils for wildlife

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow water impoundments	Excavated ponds	Openland wildlife	Woodland wildlife	Wetland wildlife
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Suited	Suited	Poorly suited	Well suited	Suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Suited	Unsuited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Suited	Suited	Unsuited	Suited	Well suited	Suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Well suited	Well suited	Well suited	Suited	Well suited	Well suited.
Suited	Well suited	Well suited	Well suited	Suited	Well suited	Well suited.
Poorly suited	Suited	Suited	Poorly suited	Well suited	Suited	Suited.
Suited	Well suited	Suited	Poorly suited	Poorly suited	Suited	Suited.
Suited	Well suited	Well suited	Well suited	Poorly suited	Suited	Well suited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Unsuited	Poorly suited	Well suited	Well suited	Suited	Poorly suited	Suited.
Unsuited	Poorly suited	Poorly suited	Poorly suited	Suited	Poorly suited	Poorly suited.
Unsuited	Poorly suited	Poorly suited	Poorly suited	Suited	Poorly suited	Poorly suited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Suited	Suited	Suited	Well suited	Suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Well suited	Well suited	Well suited	Well suited	Poorly suited	Well suited	Well suited.
Suited	Well suited	Well suited	Well suited	Poorly suited	Suited	Well suited.
Well suited	Well suited	Well suited	Well suited	Poorly suited	Well suited	Well suited.
Suited	Well suited	Well suited	Well suited	Suited	Well suited	Well suited.
Suited	Well suited	Well suited	Well suited	Suited	Well suited	Well suited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Well suited	Well suited	Well suited	Suited	Well suited	Well suited.
Suited	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited.

TABLE 7.—*Suitability of soils*

Soil	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood plants
Sharon silt loam	Suited	Well suited	Well suited	Well suited
Stoy silt loam, 0 to 2 percent slopes	Suited	Suited	Well suited	Well suited
Stoy silt loam, 2 to 4 percent slopes	Suited	Suited	Well suited	Well suited
Stoy silt loam, 4 to 7 percent slopes, eroded	Suited	Suited	Well suited	Well suited
Tamalco silt loam, 0 to 2 percent slopes	Suited	Well suited	Well suited	Suited
Tamalco silt loam, 2 to 4 percent slopes, eroded	Suited	Well suited	Well suited	Suited
Tamalco soils, 3 to 7 percent slopes, severely eroded	Poorly suited	Suited	Well suited	Suited
Wakeland silt loam	Suited	Suited	Well suited	Well suited
Wellston silt loam, 12 to 18 percent slopes, eroded	Poorly suited	Suited	Well suited	Well suited
Wellston silt loam, 18 to 30 percent slopes, eroded	Unsuited	Suited	Well suited	Well suited
Wellston soils, 7 to 12 percent slopes, severely eroded	Suited	Well suited	Well suited	Well suited
Wellston soils, 12 to 30 percent slopes, severely eroded	Unsuited	Suited	Well suited	Well suited
Wynoose silt loam	Poorly suited	Suited	Suited	Well suited
Zanesville silt loam, 7 to 12 percent slopes, eroded	Suited	Well suited	Well suited	Well suited
Zanesville silt loam, 12 to 18 percent slopes, eroded	Poorly suited	Suited	Well suited	Well suited
Zanesville soils, 7 to 12 percent slopes, severely eroded	Suited	Well suited	Well suited	Well suited

used for fairways should support intensive traffic of people on foot or driving golf carts. In addition, turf and various kinds of trees and shrubs should grow well on these soils.

Engineering Uses of the Soils [5]

This section points out the principal properties of soils that are likely to affect engineering practices. With the soil map for identification, the information presented should help engineers estimate the suitability of the soils for engineering uses, but it is not intended that this survey will eliminate the need for onsite sampling and testing for design and construction of specific engineering works involving heavy loads and excavations deeper than the depth of layers here reported.

Information in this section can be used to—

1. Make studies that will aid in planning and developing agricultural, industrial, business, residential, and recreational sites.
2. Make preliminary evaluations of the soils that will aid in selecting locations for flood-control structures, agricultural drainage systems, farm ponds, irrigation systems, diversion terraces, and waterways.
3. Make preliminary evaluations of soils and sites that will aid in selecting locations for highways and airports and in planning detailed investigations at the selected locations.
4. Locate probable sources of road and highway construction materials.
5. Correlate performance of engineering structures with soil mapping units to obtain information that will be useful in designing and maintaining such structures.
6. Determine the suitability of soil units for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make preliminary estimates for other construction purposes pertinent to the particular area.

Much of the information in this section is given in tables 9, 10, and 11.

Engineering classification systems

Engineers commonly classify soils according to the Unified Soil Classification System (*22*) and the system adopted by the American Association of State Highway Officials (AASHO) (*1*).

The Unified system of soil classification is based on the identification of soils according to particle size and distribution, plasticity, liquid limit, and organic-matter content. In this system, SM and SC are sands with nonplastic or plastic fines; GC are gravelly soils with plastic fines; ML and CL are nonplastic or plastic fine-grained materials with low liquid limit; MH and CH are primarily nonplastic or plastic fine-grained materials with a high liquid limit.

The AASHO system is used to classify soils according to those properties that affect use in highway construction. Soils of about the same general load-carrying capacity and service are placed into twelve basic groups and subgroups, A–1 to A–7. Generally, the best soils for road subgrade are classified A–1, the next best A–2, and the poorest soils are A–7.

Agricultural scientists classify soils by texture according to the system of the United States Department of Agriculture (*18*). Soil material smaller than 2.0 mm. in diameter is classified in three size fractions as clay, silt, or sand. The percentages of the three size fractions determine the texture. Some terms used in soil science, such as soil, clay, silt, and sand, differ in meaning from the same terms used in engineering. The definitions of terms as used in soil science are given in the Glossary.

[5] ROBERT L. SMITH, area engineer, Soil Conservation Service, helped prepare this section.

for wildlife—Continued

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow water impoundments	Excavated ponds	Openland wildlife	Woodland wildlife	Wetland wildlife
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Unsuited	Poorly suited	Poorly suited	Poorly suited	Well suited	Poorly suited	Poorly suited.
Unsuited	Unsuited	Unsuited	Poorly suited	Well suited	Poorly suited	Unsuited.
Unsuited	Unsuited	Unsuited	Poorly suited	Suited	Poorly suited	Unsuited.
Poorly suited	Suited	Suited	Poorly suited	Well suited	Suited	Suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Well suited	Unsuited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Suited	Well suited	Well suited	Well suited	Poorly suited	Well suited	Well suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.

Engineering test data

Table 9 shows test data for samples of several types of soil in Edwards and Richland Counties. The test results do not represent the entire range of characteristics of soils within the two counties, nor do they represent the entire range of characteristics of the types of soils tested. Nevertheless, the results can be used as a general guide in estimating properties of the other soils in the two counties.

Moisture-density data are obtained by compacting soil material at a successively higher moisture content. Assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed maximum dry density. As a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Mechanical analysis refers to the measurement of the amounts of various size classes of soil grains (sand, silt, or clay) in a sample. Proportions of the size classes determine the textural class of the material. Names used by engineers for various size classes of particles differ from those used by soil scientists. For example, fine sand in engineering terminology consists of particles 0.42 to 0.74 millimeter in diameter; whereas fine sand, as determined by the soil scientist, consists of particles 0.25 to 0.10 millimeter in diameter.

The tests to determine liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic. As the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic. The liquid limit is the moisture content at which the material passes from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which soil material is in a plastic condition.

Estimated engineering properties

Table 10 gives the estimated soil properties most likely to affect engineering practices. The information in this table is based on the test data in table 9 and other available data.

Depth to bedrock is not estimated in table 10, because most soils in the survey area are deep enough that bedrock generally does not affect their use. However, in Shale rock land, shale is at a depth of 5 to 30 inches, in Wellston soils sandstone is at a depth of about 30 inches, and in Zanesville soils sandstone is at a depth of about 45 inches.

Depth to seasonal high water table is the minimum depth at which the soil is periodically saturated or contains free water, unless drainage systems have been installed. It may be a perched water table or the upper limit of the true water table. Where very near the surface, the water table commonly interferes with timely and efficient use and management of the soil. It generally rises late in winter and early in spring.

Permeability of a soil, as used in this survey, is its ability to transmit water downward through undisturbed and uncompacted soil. It does not include lateral seepage. The estimates are based on the structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soil are not considered.

Available water capacity is that amount of capillary water in the soil available for plant growth after all free water has drained away. It is expressed in inches per inch of soil.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH indicates the corrosiveness of the soil solution and the protection that structures such as pipelines require where placed in the soil. Reaction is also used to estimate the suitability of certain plants for planting along highways. The pH value and related terms used to describe soil reaction are defined in the glossary.

Shrink-swell potential indicates the volume change to

TABLE 8.—*Recreational*

Recreation group, soil series, and map symbols	Degree of limitation and soil features affecting use for—	
	Cottages and utility buildings	Campsites
Group 1. Well drained and moderately well drained, nearly level to moderately sloping soils on uplands and terraces. Alford (308B, 308C2), Alvin (131B, 131C2), Camden (134A, 134B).	Slight	Slight
Group 2. Well drained and moderately well drained, strongly sloping and moderately steep soils on uplands. Alford (308D2), Hickory (8D2, 8D3), Wellston (339D3).	Moderate: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils.	Moderate: slope limits use
Group 3. Well drained and moderately well drained, steep soils on uplands. Alford (308F2), Hickory (8F2), Shale rock land (95), Wellston (339F2).	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.
Group 4. Well drained and moderately well drained, moderately steep and steep soils on uplands. Hickory (8E2, 8E3), Hosmer (214E2), Wellston (339E2, 339E3), Zanesville (340E2).	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and 3 to 6 feet in Zanesville soils.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils; difficult to to maintain vegetation.
Group 5. Moderately well drained, gently sloping and moderately sloping soils on uplands. Ava (14B, 14B2, 14C, 14C2), Grantsburg (301B, 301C, 301C2), Hosmer (214B, 214C2), Richview (4B, 4C2).	Slight	Moderate: slow to moderately slow permeability; difficult to maintain vegetation where use is intensive; subject to erosion.
Group 6. Moderately well drained and somewhat poorly drained, moderately sloping and strongly sloping soils on uplands and terraces. Ava (14C3, 14D2), Blair (5C2, 5C3, 5D2, 5D3), Bluford (13C2), Hosmer (214D2, 214D3), Hoyleton (3C2), Reesville (723C2), Robbs (335C2), Stoy (164C2), Zanesville (340D2, 340D3).	Moderate: slope limits use; subject to frost heave; moderate shrink-swell potential in the subsoil.	Moderate: slope limits use; slow to moderately slow permeability; difficult to maintain vegetation where use is intensive; subject to erosion; soils dry slowly.
Group 7. Somewhat poorly drained and moderately well drained, nearly level and gently sloping soils on uplands and terraces. Bluford (13A, 13B, 13B2), Hoyleton (3A, 3B, 3B2), Lukin (167), Marissa (176), McGary (173A, 173B2), Reesville (723A, 723B), Robbs (335B), Stoy (164A, 164B), Tamalco (581A, 581B2).	Moderate: seasonal high water table; subject to frost heave; moderate to high shrink-swell potential in the subsoil.	Moderate: seasonal high water table; soils dry slowly.
Group 8. Poorly drained to moderately well drained, gently sloping to strongly sloping, eroded soils that have very clayey subsoil at or near the surface; on uplands and terraces. McGary (173C2, 173C3), Tamalco (581C3), Huey (120B2, 120C3).	Severe: seasonal high water table; subject to frost heave; moderate to high shrink-swell potential in the subsoil.	Severe: seasonal high water table; slow to very slow permeability; soils dry slowly; difficult to grow and maintain vegetation.
Group 9. Poorly drained and somewhat poorly drained, nearly level soils on uplands and terraces. Chauncey (287), Cisne (2), Ebbert (48), Huey (120A), Montgomery (465), Newberry (218), Patton (142), Racoon (109), Sexton (208), Wynoose (12).	Severe: seasonal water table near surface; soils dry slowly; subject to frost heave; moderate to high shrink-swell potential in the subsoil; some soils are difficult to drain.	Severe: seasonal water table near surface; soils dry slowly; some soils are difficult to drain.
Group 10. Poorly drained and very poorly drained, nearly level soils on bottom lands. Bonnie (108), Darwin (71), Petrolia (288).	Severe: subject to flooding; seasonal water table near surface; subject to frost heave; difficult to drain.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; difficult to drain; turf easily damaged where wet.
Group 11. Somewhat poorly drained to well-drained, nearly level soils on bottom lands. Allison (306), Belknap (382), Coffeen (428), Sharon (72), Wakeland (333).	Severe: subject to flooding.	Severe: subject to flooding.

uses of the soils

Degree of limitation and soil features affecting use for—Continued			
Picnic areas	Playgrounds	Paths and trails	Golf fairways
Slight	Slight on 0 to 2 percent slopes, moderate on 2 to 7 percent slopes; moderate limitations for grading and leveling.	Slight	Slight.
Moderate: slope limits use	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils.	Moderate: slope limits use	Moderate: slope limits use.
Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils, and rock crops out in places; Shale rock land has shaly material near surface.
Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils; difficult to maintain vegetation.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils; difficult to maintain vegetation.	Moderate: slope limits use; rock crops out in places.	Severe: slope limits use; bedrock is at a depth of 2 to 4 feet in Wellston soils; rock crops out in places; difficult to maintain vegetation.
Slight	Moderate: slope limits use; slow to moderately slow permeability; difficult to maintain vegetation where use is intensive.	Slight	Slight.
Moderate: slope limits use	Severe: slope limits use; severe limitations for grading and leveling.	Moderate: soils dry slowly	Moderate: slope limits use; soils dry slowly.
Moderate: seasonal high water table; soils dry slowly.	Moderate: seasonal high water table; soils dry slowly; slopes are more than 2 percent in places.	Moderate: seasonal high water table; soils dry slowly.	Moderate: seasonal high water table; soils dry slowly.
Severe: seasonal high water table; soils dry slowly; difficult to grow and maintain vegetation.	Severe: slope limits use; seasonal high water table; slow to very slow permeability; soils dry slowly; bare soil is slippery and sticky where wet; difficult to grow and maintain vegetation.	Severe: bare soil is slippery and sticky where wet; seasonal high water table; soils dry slowly.	Severe: difficult to grow and maintain vegetation; seasonal high water table; soils dry slowly; slope is a moderate limitation.
Severe: seasonal water table near surface; soils dry slowly; some soils are difficult to drain.	Severe: seasonal water table near surface; soils dry slowly; some soils are difficult to drain; bare soils are slippery and sticky where wet.	Severe: seasonal water table near surface; soils dry slowly; some soils are difficult to drain.	Severe: seasonal water table near surface; soils dry slowly; some soils are difficult to drain.
Severe: subject to flooding; seasonal water table near surface; soils dry slowly; difficult to drain; turf easily damaged where wet.	Severe: subject to flooding; seasonal water table near surface; bare soils are slippery and sticky where wet; soils dry slowly; difficult to drain; turf easily damaged where wet.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; difficult to drain; turf easily damaged where wet.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; difficult to drain; turf easily damaged where wet.
Severe: subject to flooding; moderate in small bottom lands that are infrequently flooded.	Severe: subject to flooding; moderate in small bottom lands that are infrequently flooded.	Moderate: subject to flooding.	Severe: subject to flooding; moderate in small bottom lands that are infrequently flooded.

TABLE 9.—*Engineering*

[Tests performed by Illinois Division of High-

Soil name and location of sample	Parent material	Illinois report No.	Depth from surface	Moisture-density data [1]	
				Maximum dry density	Optimum moisture
			Inches	*Lb. per cu. ft.*	*Percent*
Ava silt loam (Edwards County):					
165 feet west of quarter line and 125 feet north of center of road, NE¼NW¼SE¼ sec. 17, T. 1 N., R. 10 E. (modal).	Loess over gritty, uniform material of unknown origin.	64–12745	14–24	106	20
		64–12746	34–44	112	17
		64–12747	44–50	120	13
205 feet west and 40 feet north of the southeast corner of quarter section, NE¼SW¼SE¼ sec. 31, T. 2 N., R. 10 E. (nonmodal—thicker fragipan).	Loess over gritty, uniform material of unknown origin.	64–12751	12–16	97	23
		64–12752	27–36	112	17
		64–12753	36–50	120	12
Bluford silt loam (Edwards County):					
495 feet northwest and 285 feet west of southeast corner of quarter section SW¼NW¼SE¼ sec. 26, T. 1 S., R. 10 E. (modal).	Loess over gritty material or drift.	65–13285	6–15	111	15
		65–13286	24–32	102	21
		65–13287	40–55	116	15
Bonnie silt loam (Edwards County):					
425 feet south of northeast corner of NW¼ and 50 feet west of quarter line NW¼NW¼ sec. 34, T. 2 N., R. 14 W. (modal).	Alluvium.	65–13278	0–6	105	19
		65–13279	13–21	104	20
		65–13280	21–51	108	18
McGary silt loam (Edwards County):					
15 feet east of concrete highway marker on Illinois Route 15 and 15 feet north into field near northwest corner of SE¼ sec. 33, T. 1 S., R. 14 W. (modal).	Alluvium.	64–12748	5–9	109	17
		64–12749	16–21	101	22
		64–12750	40–64	109	19
Patton silty clay loam (Edwards County):					
410 feet south of northwest corner of SW¼ and 135 feet east of center of road, sec. 18, T. 3 S., R. 10 E. (modal).	Alluvium or loess.	64–12742	8–17	111	17
		64–12743	24–33	105	20
		64–12744	50–58	119	13
450 feet north of southwest corner and 50 feet east of road, sec. 8, T. 3 S., R. 10 E. (nonmodal—fine textured).	Alluvium or loess.	64–12756	7–15	106	20
		64–12757	24–35	105	21
		64–12758	50–65	114	16
Wellston silt loam (Edwards County):					
185 feet west of road fork in pit on north side of road SW¼SE¼SE¼ sec. 1, T. 3 S., R. 10 E. (nonmodal—deep).	Thin loess blanket over sandstone and shale bedrock (sandstone dominant).	64–12759	14–18	120	13
		64–12760	18–22	119	13
		64–12761	30–45	117	15
590 feet west and 430 feet south of northeast corner SE¼SE¼ sec. 28, T. 2 S., R. 10 E. (modal).	Thin loess blanket over sandstone and shale bedrock (sandstone dominant).	64–12754	5–14	103	21
		64–12755	14–21	118	14
Wynoose silt loam (Edwards County):					
20 feet north of southwest corner of NW¼ and 40 feet east of highway SW¼NW¼ sec. 1, T. 1 S., R. 10 E. (modal).	Loess over gritty material or drift.	65–13281	0–6	112	14
		65–13282	6–16	114	14
		65–13283	19–29	102	22
		65–13284	50–70	113	16
Bluford silt loam (Richland County):					
Approximately 600 feet east of southwest corner of the quarter section and 40 feet north of road SW¼ SE¼ sec. 18, T. 4 N., R. 9 E. (nonmodal—better drained and thinner loess).	Loess over gritty material or or drift.	65–13267	11–15	99	22
		65–13268	24–32	114	15
		65–13269	38–50	121	12
		65–13270	50–75	110	17
825 feet north of half-mile line on east side of section and 1,400 feet west of road NE¼ SW¼ NE¼ sec. 2, T. 3 N., R. 8 E. (nonmodal—fine textured).	Alluvium.	65–13264	0–5	100	22
		65–13265	15–33	106	20
		65–13266	33–50	105	19

See footnote at end of table.

test data

ways, Bureau of Materials, Springfield, Illinois]

Mechanical analysis [2]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—						AASHO	Unified [3]
¾-in.	⅜-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
										Percent			
--------	--------	--------	100	99	95	93	83	36	32	36	16	A-6(10)	CL
--------	--------	--------	100	97	86	85	72	34	30	33	16	A-6(10)	CL
--------	--------	--------	100	92	71	67	54	26	23	23	8	A-4(7)	CL
--------	--------	--------	100	99	98	96	76	50	47	44	21	A-7-6(13)	CL
--------	--------	--------	100	99	88	83	64	30	26	30	12	A-6(9)	CL
--------	--------	--------	100	96	68	64	52	22	18	20	5	A-4(7)	ML-CL
--------	--------	100	99	92	86	81	65	26	22	21	2	A-4(8)	ML
--------	--------	100	96	94	91	90	75	46	43	36	14	A-6(10)	ML-CL
--------	--------	--------	100	98	80	71	61	30	25	25	9	A-4(8)	CL
--------	--------	--------	100	99	97	95	86	40	37	34	10	A-4(8)	ML-CL
--------	--------	--------	100	96	94	92	78	43	41	34	10	A-4 8)	ML-CL
--------	--------	--------	100	95	93	90	81	38	35	30	8	A-4(8)	ML-CL
--------	--------	--------	100	94	86	83	67	24	20	26	6	A-4(8)	ML-CL
--------	--------	--------	100	99	97	96	88	66	63	59	35	A-7-6(20)	CH
--------	--------	--------	100	99	98	94	82	56	52	41	21	A-7-6(13)	CL
--------	--------	--------	100	99	76	72	58	32	28	30	12	A-6(9)	CL
--------	--------	--------	--------	100	81	78	66	44	41	42	23	A-7-6(13)	CL
--------	--------	--------	100	98	75	70	54	28	25	29	13	A-6(9)	CL
--------	--------	--------	100	99	96	92	75	44	40	40	18	A-6(11)	CL
--------	--------	--------	--------	100	97	94	75	50	44	45	22	A-7-6(14)	CL
--------	--------	--------	100	99	95	91	70	36	32	36	19	A-6(12)	CL
--------	--------	--------	--------	100	68	60	42	22	16	19	3	A-4(7)	ML
--------	--------	--------	100	96	37	36	28	20	18	22	7	A-4(1)	SM-SC
--------	--------	--------	100	97	59	52	38	24	22	22	4	A-4(5)	ML-CL
--------	--------	--------	--------	100	96	91	78	40	32	36	15	A-6(10)	CL
--------	--------	--------	100	97	67	62	50	26	21	24	8	A-4(7)	CL
100	99	98	98	93	78	75	60	20	16	22	4	A-4(8)	ML-CL
--------	--------	100	99	95	82	78	61	22	18	21	3	A-4(8)	ML
100	99	99	98	97	90	89	81	47	42	38	15	A-6(10)	CL
--------	--------	100	99	97	83	79	62	38	34	33	17	A-6(11)	CL
--------	--------	--------	100	99	93	86	72	42	37	45	22	A-7-6(13)	CL
--------	--------	100	99	95	71	65	47	31	29	31	14	A-6(9)	CL
--------	--------	100	99	92	60	57	46	28	25	27	12	A-6(6)	CL
99	97	96	95	92	78	75	63	40	36	43	26	A-7-6(15)	CL
--------	--------	--------	100	95	92	87	76	48	43	32	11	A-6(8)	ML-CL
--------	--------	--------	100	94	92	90	86	53	49	34	12	A-6(9)	ML-CL
--------	--------	--------	100	98	96	91	74	50	46	33	12	A-6(9)	CL

TABLE 9.—*Engineering*

Soil name and location of sample	Parent material	Illinois report No.	Depth from surface	Moisture-density data [1]	
				Maximum dry density	Optimum moisture
			Inches	*Lb. per cu. ft.*	*Percent*
Ebbert silt loam (Richland County):					
925 feet west of northeast corner of section and 280 feet south of center of road NE¼ NE¼ sec. 35, T. 5 N., R. 9 E. (modal).	Loess over Illinoian drift.	65–13271	7–12	99	22
		65–13272	22–32	97	21
		65–13273	48–84	106	20
Huey silt loam (Richland County):					
580 feet south of half-mile line on west side of section and 50 feet east into field SW¼ NW¼ NW¼ sec. 29, T. 2 N., R. 9 E. (modal).	Loess over gritty material or drift.	65–13258	6–11	111	16
		65–13259	11–21	102	20
		65–13260	34–47	118	13
410 feet south of northeast corner of SE¼ and 480 feet west of center of road SW¼ SE¼ sec. 17, T. 3 N., R. 14 W. (nonmodal—sloping, eroded, thin loess).	Loess over gritty material or drift.	65–13261	0–7	114	15
		65–13262	18–25	113	16
		65–13263	60–75	112	16

[1] Based on AASHO Designation T 99, Method A (*1*).
[2] Mechanical analyses according to AASHO Designation T 88–57 (*1*). Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the

TABLE 10.—*Estimated*

[Absence of an entry indicates information

Soil series and map symbols	Depth to seasonal high water table	Depth from surface [1]	Classification		
			Dominant USDA texture	Unified	AASHO
	Feet	*Inches*			
Alford: 308B, 308C2, 308D2, 308F2	5–10	0–11	Silt loam	ML or CL	A–4
		11–65	Silty clay loam	CL	A–6
		65–85	Silt loam	ML or CL	A–4 or A–6
Allison: 306	3–10	0–42	Light silty clay loam to heavy silt loam.	CL	A–6
		42–60	Stratified loam, sandy loam, silt loam, and silty clay loam.	ML or SM	A–2 or A–4
Alvin: 131B, 131C2	5–10	0–18	Fine sandy loam	SM or ML	A–4
		18–40	Sandy clay loam to sandy loam	SC or CL	A–4 or A–6
		40–75	Loamy sand to sand	SP or SM	A–2 or A–3
Ava: 14B, 14B2, 14C, 14C2, 14C3, 14D2.	3–5	0–10	Silt loam	ML or CL	A–4
		10–34	Silty clay loam	CL	A–6 or A–7
		34–44	Gritty silty clay loam	CL	A–4 or A–6
		44–60	Gritty light silty clay loam	CL or ML–CL	A–4
Belknap: 382	1–3	0–29	Silt loam	ML	A–4
		29–60	Silt loam	ML	A–4
Blair: 5C2, 5C3, 5D2, 5D3	1–3	0–5	Gritty silt loam	ML or CL	A–4
		5–65	Gritty silty clay loam to heavy clay loam.	CL	A–6 or A–7
		65–70	Clay loam to gritty silty clay loam.	CL	A–6 or A–7

See footnotes at end of table.

test data—Continued

Mechanical analysis [2]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—							
¾-in.	⅜-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0. 05 mm.	0. 02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [3]
											Percent		
--------	--------	--------	100	98	91	87	73	41	38	38	13	A–6(8)	ML–CL
--------	--------	--------	100	99	94	92	81	55	51	51	28	A–7–6(17)	CH
--------	--------	100	99	98	89	85	72	42	39	45	26	A–7–6(15)	CL
--------	100	98	96	89	76	74	60	23	21	24	1	A–4(8)	ML
--------	--------	100	99	97	90	87	73	46	40	40	20	A–6(12)	CL
--------	--------	100	99	92	67	63	57	33	30	27	13	A–6(8)	CL
--------	--------	--------	100	96	82	79	68	33	31	30	13	A–6(9)	CL
--------	--------	100	99	98	90	87	71	38	35	33	15	A–6(10)	CL
--------	100	99	99	97	86	83	64	34	32	29	11	A–6(8)	CL

material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

[3] SCS and the Bureau of Public Roads have agreed to give all soils having plasticity indexes within two points of A-line a borderline classification, such as ML–CL.

engineering properties

was not available or does not apply]

Percent passing sieve—			Permeability [2]	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
			Inches per hour	*Inches per inch of soil*	*pH*		
100	95–100	90–100	0. 63–2. 0	0. 20–0. 25	5. 6–6. 5	Low	
100	95–100	90–100	0. 63–2. 0	0. 19–0. 21	5. 1–6. 0	Low	Moderate.
100	90–100	90–100	0. 63–2. 0	0. 18–0. 23	5. 6–6. 5	Low	Moderate.
100	95–100	75–100	0. 63–2. 0	0. 20–0. 25	5. 6–7. 3	Moderate	Moderate.
95–100	50–90	25–90	0. 63–6. 30	0. 12–0. 18	5. 6–6. 5	Low	Moderate.
100	95–100	35–60	0. 63–2. 0	0. 13–0. 17	5. 6–6. 5	Low	
100	95–100	40–70	0. 63–2. 0	0. 14–0. 16	5. 1–6. 0	Low	Moderate.
100	95–100	0–20	6. 3–20. 0	0. 02–0. 04	5. 1–6. 0	Low	Moderate.
100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	95–100	90–100	0. 20–0. 63	0. 19–0. 21	4. 5–5. 5	Moderate	Moderate.
100	95–100	90–100	0. 06–0. 20	[3] 0. 19–0. 21	4. 5–5. 5	Moderate	Moderate.
100	90–100	80–95	0. 20–0. 63	0. 16–0. 19	4. 5–5. 5	Low	Moderate.
100	95–100	80–100	0. 20–0. 63	0. 20–0. 25	5. 1–6. 5	Low	Moderate.
100	95–100	80–100	0. 20–2. 0	0. 18–0. 25	4. 5–5. 5	Low	High.
95–100	90–100	65–100	0. 20–0. 63	0. 20–0. 25	5. 1–6. 0	Low to moderate	
95–100	90–100	60–85	0. 06–0. 20	0. 16–0. 19	4. 1–5. 5	Moderate	High.
90–100	80–90	60–75	0. 20–0. 63	0. 16–0. 18	5. 1–6. 0	Moderate	Moderate.

TABLE 10.—*Estimated*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface [1]	Classification		
			Dominant USDA texture	Unified	AASHO
	Feet	*Inches*			
Bluford: 13A, 13B, 13B2, 13C2	1–3	0–13	Silt loam	ML or CL	A–4
		13–40	Silty clay loam	CL	A–6 or A–7
		40–60	Gritty silt loam	CL	A–4 or A–6
Bonnie: 108	0–1	0–21	Silt loam	ML–CL or CL	A–4 or A–6
		21–60	Silt loam	ML–CL or CL	A–4 or A–6
Camden: 134A, 134B	5–10	0–16	Silt loam	ML	A–4
		16–43	Silty clay loam	CL	A–6
		43–67	Stratified silt loam, loam, and fine sandy loam.	ML, CL, SM	A–4 or A–6
Chauncey: 287	0–1	0–28	Silt loam	ML or CL	A–4
		28–50	Silty clay loam	CL or CH	A–6 or A–7
		50–62	Silt loam	ML or CL	A–4 or A–6
Cisne: 2	0–1	0–18	Silt loam	ML or CL	A–4
		18–36	Silty clay loam	CL or CH	A–6 or A–7
		36–52	Silty clay loam	CL	A–6
		52–70	Silty clay loam	CL	A–6
Coffeen: 428	1–3	0–36	Silt loam	ML	A–4
		36–50	Silt loam to loam	ML	A–4
		50–70	Sandy loam, loam to loamy sand (some sandstone residuum or hard rock).	SM	A–2
Darwin: 71	0–1	0–65	Silty clay to clay	CH	A–7
Ebbert: 48	0–1	0–18	Silt loam	ML–CL or CL	A–6
		18–48	Silty clay loam	CH	A–7–6
		48–80	Gritty silty clay loam	CL	A–7–6
Grantsburg: 301B, 301C, 301C2	3–5	0–11	Silt loam	ML or CL	A–4
		11–25	Silty clay loam	CL	A–6
		25–50	Silty clay loam to heavy silt loam	CL	A–6
		50–60	Gritty silt loam	ML or CL	A–4 or A–6
Hickory: 8D2, 8D3, 8E2, 8E3, 8F2	5–10	0–6	Loam	ML	A–4
		6–60	Clay loam	CL	A–6
		60–70	Clay loam, loam, gravelly clay loam, and gravelly loam.	SC	A–2
Hosmer: 214B, 214C2, 214D2, 214D3, 214E2.	3–5	0–10	Silt loam	ML or CL	A–4
		10–38	Silt loam to silty clay loam	CL	A–6 or A–7
		38–57	Silt loam	ML or CL	A–4 or A–6
		57–68	Silt loam	ML or CL	A–4
Hoyleton: 3A, 3B, 3B2, 3C2	1–3	0–14	Silt loam	ML or CL	A–4
		14–32	Silty clay loam	CL	A–6 or A–7
		32–72	Gritty silty clay loam	CL	A–6
Huey: 120A, 120B2, 120C3	0–1	0–11	Silt loam	ML or CL	A–4 or A–6
		11–34	Silty clay loam	CL	A–6
		34–60	Gritty silty clay loam	CL	A–6
Lukin: 167	1–3	0–26	Silt loam	ML or CL	A–4
		26–52	Silty clay loam	CL	A–6
		52–60	Silt loam	ML or CL	A–4 or A–6
Marissa: 176	1–3	0–16	Silt loam	ML or CL	A–4
		16–45	Silty clay loam	CL	A–6
		45–67	Stratified silty clay loam, silt loam, and loam.	ML or CL	A–4 or A–6
		67–72	Sand	SP or SM	A–3
McGary: 173A, 173B2, 173C2, 173C3.	1–3	0–12	Silt loam	ML or CL	A–4 or A–6
		12–40	Silty clay	CH	A–7–6
		40–72	Stratified clay and silty clay	CH or CL	A–7–6

See footnotes at end of table.

engineering properties—Continued

Percent passing sieve—			Permeability [2]	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	*Inches per hour*	*Inches per inch of soil*	*pH*		
100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low to moderate	
100	95–100	90–100	0. 06–0. 20	0. 19–0. 21	4. 5–5. 5	Moderate	High.
100	90–100	80–95	0. 20–0. 63	0. 16–0. 19	4. 5–6. 0	Moderate	Moderate.
100	95–100	80–100	0. 06–0. 20	0. 20–0. 25	4. 5–6. 0	Low	
100	95–100	80–100	0. 06–0. 20	0. 20–0. 25	4. 5–5. 5	Low	Moderate.
100	95–100	80–95	0. 63–2. 0	0. 20–0. 25	5. 6–6. 5	Low	
95–100	90–100	60–90	0. 63–2. 0	0. 16–0. 19	5. 6–6. 0	Moderate	Moderate.
90–100	80–95	40–80	0. 63–2. 0	0. 12–0. 16	5. 6–6. 0	Low	Low.
100	95–100	95–100	0. 20–0. 63	0. 20–0. 25	4. 5–6. 5	Low	
100	95–100	90–95	0. 06–0. 20	0. 15–0. 19	4. 5–6. 0	Moderate to high	Moderate.
100	95–100	80–95	0. 20–0. 63	0. 19–0. 23	5. 6–6. 0	Low	Moderate.
100	95–100	95–100	0. 20–0. 63	0. 20–0. 25	5. 1–6. 5	Low	
100	95–100	90–95	<0. 20	0. 15–0. 19	4. 5–5. 5	High	High.
100	90–100	80–95	0. 20–0. 63	0. 19–0. 21	5. 1–5. 5	Moderate	High.
100	90–100	80–95	0. 10–0. 63	0. 19–0. 21	5. 6–6. 0	Moderate	Moderate.
100	95–100	80–100	0. 63–2. 0	0. 20–0. 25	5. 6–6. 5	Low	Moderate.
100	95–100	60–95	0. 63–2. 0	0. 19–0. 25	5. 1–6. 5	Low	Moderate.
80–100	70–90	15–35	2. 0–6. 3	0. 05–0. 10	5. 6–7. 3	Low	Moderate.
100	100	95–100	<0. 06	0. 16–0. 19	6. 1–7. 3	High	Low.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	4. 5–6. 5	Low	
95–100	95–100	90–95	0. 06–0. 20	0. 19–0. 21	4. 5–6. 0	Moderate	Moderate.
95–100	90–100	80–90	0. 06–0. 20	0. 16–0. 19	5. 6–6. 5	Moderate	Moderate.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	100	95–100	0. 63–2. 0	0. 19–0. 21	4. 5–5. 5	Moderate	High.
100	100	90–100	0. 06–0. 20	[3] 0. 15–0. 17	4. 2–5. 0	Moderate	High.
100	90–100	60–90	0. 20–0. 63	0. 18–0. 22	4. 2–4. 5	Low	High.
95–100	90–100	50–80	0. 63–2. 0	0. 16–0. 20	4. 5–6. 0	Low	
95–100	90–100	55–85	0. 63–2. 0	0. 16–0. 18	4. 5–6. 0	Moderate	High.
75–100	50–75	10–35	0. 63–6. 3	0. 14–0. 18	5. 1–6. 5	Low	Moderate.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	100	95–100	0. 63–2. 0	0. 19–0. 21	4. 5–5. 5	Moderate	High.
100	100	95–100	0. 06–0. 20	[3] 0. 18–0. 19	4. 5–5. 5	Low	High.
100	95–100	90–100	0. 20–0. 63	0. 18–0. 23	5. 1–5. 5	Low	Moderate.
100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	95–100	90–100	0. 06–0. 20	0. 19–0. 21	4. 5–5. 5	Moderate to high	High.
100	90–100	80–95	0. 20–0. 63	0. 19–0. 21	5. 6–6. 0	Moderate	Moderate.
100	95–100	95–100	0. 20–0. 63	0. 19–0. 21	4. 5–6. 5	Low	
100	95–100	90–100	<0. 06	[3] 0. 15–0. 17	7. 4–8. 4	Moderate	High.
100	90–100	80–95	0. 06–0. 20	0. 18–0. 20	7. 9–8. 4	Moderate	High.
100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	95–100	90–100	0. 06–0. 20	0. 19–0. 21	5. 1–6. 5	Moderate	Moderate.
100	90–100	80–95	0. 20–0. 63	0. 20–0. 25	5. 6–6. 5	Low	Moderate.
100	95–100	80–95	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	
100	90–100	60–90	0. 20–2. 0	0. 19–0. 21	6. 1–7. 3	Moderate	Low.
95–100	80–95	50–80	0. 63–2. 0	0. 14–0. 18	7. 4–8. 4	Low	Low.
75–100	70–90	0–10	2. 00–20. 0	0. 02–0. 04	7. 4–8. 4	Low	Low.
100	95–100	90–100	0. 63–2. 0	0. 20–0. 25	5. 6–6. 5	Low	
100	95–100	95–100	<0. 06	[3] 0. 15–0. 18	6. 1–7. 8	Moderate to high	Low.
100	90–100	85–100	<0. 06	0. 15–0. 18	7. 4–8. 4	Moderate	Low.

408-102—72——5

TABLE 10.—*Estimated*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface [1]	Classification		
			Dominant USDA texture	Unified	AASHO
	Feet	*Inches*			
Montgomery: 465	0–1	0–15	Silty clay	MH–CH or CH	A–7
		15–55	Silty clay	MH–CH or CH	A–7
		55–65	Silty clay to silty clay loam	CH or CL	A–7 or A–6
Newberry: 218	0–1	0–19	Silt loam	ML or CL	A–4
		19–40	Silty clay loam	CL	A–6 or A–7
		40–60	Gritty silty clay loam	CL	A–6
Patton: 142	0–1	0–15	Silty clay loam	CL	A–6
		15–47	Silty clay loam	CL	A–7–6
		47–80	Stratified silty clay loam and silt loam.	CL or ML	A–6 or A–4
Petrolia: 288	0–1	0–12	Silty clay loam	CL	A–6
		12–53	Silty clay loam	CL	A–6
		53–65	Silty clay loam	CL	A–6
Racoon: 109	0–1	0–26	Silt loam	ML or CL	A–4
		26–43	Silty clay loam	CL or CH	A–6 or A–7
		43–60	Silt loam	ML or CL	A–4 or A–6
Reesville: 723A, 723B, 723C2	1–3	0–10	Silt loam	ML or CL	A–4
		10–45	Silty clay loam	CL or CH	A–6 or A–7
		45–70	Stratified silt loam and silty clay loam.	ML or CL	A–4 or A–6
Richview: 4B, 4C2	3–5	0–13	Silt loam	ML or CL	A–4
		13–48	Silty clay loam	CL	A–6
		48–60	Gritty light silty clay loam to silt loam.	ML or CL	A–4 or A–6
Robbs: 335B, 335C2	1–3	0–14	Silt loam	ML or CL	A–4
		14–47	Silty clay loam	CL	A–6
		47–100	Gritty silt loam to loam	ML or CL	A–4 or A–6
Sexton: 208	0–1	0–18	Silt loam	ML or CL	A–4
		18–40	Silty clay loam	CL	A–6 or A–7
		40–60	Stratified silt loam, loam, and silty clay loam.	ML or CL	A–4 or A–6
Shale rock land: 95	(4)	0–10	Silty clay loam (soapy)	CH	A–7
		10	Thin-bedded shale and siltstone.		
Sharon: 72	5–10	0–40	Silt loam	ML	A–4
		40–60	Stratified silt loam, loam, and sandy loam.	SM or ML	A–2 or A–4
Stoy: 164A, 164B, 164C2	1–3	0–17	Silt loam	CL or ML–CL	A–4 or A–6
		17–45	Silty clay loam	CL or CH	A–7 or A–6
		45–65	Silt loam	ML or CL	A–4 or A–6
Tamalco: 581A, 581B2, 581C3	3–5	0–12	Silt loam	ML or CL	A–4
		12–21	Silty clay loam to silty clay	CH	A–7
		21–46	Silty clay loam	CL	A–6
		46–60	Gritty silty clay loam to clay loam	CL	A–6
Wakeland: 333	1–3	0–60	Silt loam	ML	A–4
Wellston: 339D3, 339E2, 339E3, 339F2.	(6)	0–5	Silt loam	ML or CL	A–4 or A–6
		5–30	Silty clay loam	CL	A–4 or A–6
		30	Sandstone bedrock.		

See footnotes at end of table.

engineering properties—Continued

Percent passing sieve—			Permeability [2]	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
			Inches per hour	*Inches per inch of soil*	*pH*		
100	100	95–100	0. 06–0. 20	0. 16–0. 19	6. 1–6. 5	Moderate	Low.
100	95–100	90–100	0. 06–0. 63	0. 16–0. 19	6. 1–7. 8	Moderate to high	Low.
100	90–100	85–100	0. 06–0. 20	0. 16–0. 19	7. 4–8. 4	Moderate	Low.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	100	95–100	0. 06–0. 20	0. 19–0. 21	5. 1–5. 5	Moderate	Moderate.
95–100	90–100	85–95	0. 20–0. 63	0. 19–0. 21	5. 1–6. 0	Low to moderate	Moderate.
100	100	80–100	0. 63–2. 0	0. 19–0. 25	6. 6–7. 3	Moderate	
100	100	80–100	0. 20–2. 0	0. 19–0. 21	6. 1–7. 8	Moderate	Low.
100	100	70–100	0. 20–2. 0	0. 18–0. 23	7. 4–8. 4	Low	Low.
100	95–100	80–100	0. 20–0. 63	0. 19–0. 25	6. 1–7. 3	Moderate	
100	95–100	80–100	0. 20–0. 63	0. 19–0. 21	5. 6–6. 5	Moderate	Moderate.
100	95–100	80–100	0. 20–0. 63	0. 19–0. 21	5. 6–6. 5	Moderate	Moderate.
100	95–100	80–100	0. 20–0. 63	0. 20–0. 25	5. 1–6. 0	Low	
100	95–100	80–100	0. 06–0. 20	0. 18–0. 20	4. 5–5. 5	Moderate	Moderate.
95–100	90–100	70–100	0. 20–0. 63	0. 18–0. 23	5. 6–6. 5	Low	Moderate.
100	95–100	85–100	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	
100	95–100	85–100	0. 20–0. 63	0. 19–0. 21	5. 6–7. 8	Moderate	Low.
95–100	85–100	70–95	0. 20–2. 0	0. 18–0. 23	7. 4–8. 4	Low	Low.
100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 6–6. 5	Low	
100	95–100	90–100	0. 20–0. 63	0. 19–0. 21	5. 1–5. 5	Moderate	Moderate.
100	90–100	80–95	0. 20–0. 63	0. 18–0. 23	5. 1–6. 0	Low	Moderate.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	4. 5–6. 0	Low	
100	100	95–100	0. 06–0. 20	0. 19–0. 21	4. 2–5. 0	Moderate	High.
100	90–100	60–90	0. 20–0. 63	0. 15–0. 18	4. 2–5. 0	Low	High.
100	100	90–100	0. 20–0. 63	0. 20–0. 25	5. 6–6. 5	Low	
100	100	90–100	0. 06–0. 2	0. 19–0. 21	5. 1–6. 0	Moderate to high	Moderate.
100	95–100	50–80	0. 63–6. 3	0. 16–0. 20	5. 6–6. 5	Low	Low.
95–100	90–100	90–95	[5]	[5]	4. 2–5. 0		
100	100	75–100	0. 63–2. 0	0. 20–0. 25	4. 5–6. 5	Low	Moderate.
95–100	90–100	25–90	0. 63–6. 3	0. 10–0. 15	5. 1–6. 0	Low	Moderate.
100	100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	100	95–100	0. 06–0. 20	0. 19–0. 21	4. 5–5. 5	Moderate	Moderate.
100	95–100	85–100	0. 20–0. 63	0. 18–0. 21	5. 1–6. 0	Low	Moderate.
100	95–100	90–100	0. 63–2. 0	0. 20–0. 25	5. 1–6. 5	Low	
100	95–100	95–100	<0. 06	0. 17–0. 18	4. 5–5. 5	High	High.
100	95–100	90–100	0. 06–0. 20	[3] 0. 17–0. 19	6. 6–8. 4	Moderate	High.
95–100	70–90	60–80	0. 06–0. 20	0. 16–0. 18	7. 4–9. 0	Moderate	High.
100	100	80–100	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	Low.
100	90–100	75–90	0. 63–2. 0	0. 18–0. 23	5. 6–6. 0	Low	
95–100	80–100	55–80	0. 63–2. 0	0. 19–0. 21	4. 2–5. 5	Low	High.

TABLE 10.—*Estimated*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface [1]	Classification: Dominant USDA texture	Unified	AASHO
	Feet	*Inches*			
Wynoose: 12	0–1	0–16	Silt loam	ML or CL	A–4
		16–42	Silty clay loam to silty clay	CL	A–6 or A–7
		42–70	Gritty silty clay loam	CL	A–6
Zanesville: 340D2, 340D3, 340E2	(6)	0–8	Silt loam	ML or CL	A–4
		8–30	Silty clay loam	CL	A–6
		30–45	Light silty clay loam to gritty silt loam.	ML or CL	A–4 or A–6
		45	Sandstone bedrock.		

[1] On severely eroded soils most or all of the first depth shown has been eroded, and the second depth is exposed. Therefore, the engineering properties of the present surface layer of severely eroded soils are more like those shown for the second depth.

[2] Permeability classes are as follows: less than 0.06, very slow; 0.06 to 0.20, slow: 0.20 to 0.63, moderately slow; 0.63 to 2.0, moderate; 2.0 to 6.3, moderately rapid; 6.3 to 20.0, rapid.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of— Topsoil	Highway subgrade material	Soil features affecting suitability for— Highway location	Foundations for low buildings	Farm ponds: Reservoir area	Farm ponds: Embankments
Alford: 308B, 308C2, 308D2, 308F2.	Good in surface layer.	Poor to fair	Deep loess; unstable when wet; moderate susceptibility to frost heaving.	Deep loess; fair to poor shear strength; low shrink-swell potential; subject to piping.	Moderate seepage; underlain by undesirable material in places.	Subsoil and substrata have poor stability and compaction; poor resistance to piping; silty.
Allison: 306	Good in upper 4 feet; thin sandy layers in places below a depth of 4 feet.	Fair to good	Subject to flooding	Moderate shrink-swell potential in upper 3½ feet; low shrink-swell potential below 3½ feet; fair to good shear strength; moderately well drained bottom land.	Bottom-land soil along Embarras River channel; underlain by variable material, permeable enough in places to allow excessive seepage.	Fair stability and compaction.
Alvin: 131B, 131C2	Fair in surface layer; somewhat sandy.	Fair to poor in subsoil, fair to good in substrata.	Exposed sand is erodible; moderate susceptibility to frost heaving in upper 2 to 3 feet.	Fair shear strength; low shrink-swell potential.	Underlain by sand at a depth of 2 to 3 feet; excessive seepage.	Subsoil has fair stability; substrata are rapidly permeable.
Ava: 14B, 14B2, 14C, 14C2, 14C3, 14D2.	Good to fair in surface layer; fair to poor on eroded slopes.	Poor to fair	Slopes are erodible; moderate to high susceptibility to frost heaving; lower horizons are somewhat plastic.	Fair shear strength; moderate shrink-swell potential; lateral seepage in subsoil.	Slight seepage	Subsoil and substrata have fair to good stability and compaction; good resistance to piping.

engineering properties—Continued

Percent passing sieve— No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	Permeability [2]	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
			Inches per hour	*Inches per inch of soil*	*pH*		
100	95–100	95–100	0.20–0.63	0.20–0.25	5.1–6.5	Low	
100	95–100	90–100	<0.06	0.15–0.18	4.5–5.0	Moderate to high	High.
100	90–100	80–95	0.20–0.63	0.19–0.21	4.5–6.0	Moderate	Moderate.
100	95–100	85–100	0.63–2.0	0.20–0.25	5.1–6.5	Low	
95–100	80–100	75–95	0.20–0.63	0.19–0.21	4.5–5.5	Moderate	High.
80–95	60–90	50–85	0.06–0.2	0.15–0.17	4.2–5.0	Low	High.

[3] Root penetration is somewhat restricted at this depth, and plants cannot use all of the available water.
[4] Not applicable.
[5] Variable.
[6] Perched water table above the sandstone during wet periods.

interpretations

Soil features affecting suitability for—Continued: Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Degree and kind of limitation for use as—: Septic tank filter fields	Sewage lagoons
Natural drainage is adequate.	Medium intake rate; moderate permeability; high available water capacity; many areas sloping.	No major construction problems if topography is favorable.	No major construction problems.	Slight for 308B, moderate for 308C2 and 308D2, severe for 308F2: slope is limiting factor; soil is moderately permeable.	Moderate where slope is 2 to 7 percent, severe where slope is more than 7 percent; moderately permeable; some seepage likely.
Natural drainage is adequate.	Moderate permeability; high available water capacity; medium intake rate; subject to flooding.	Not needed	Not needed	Severe: subject to occasional to frequent flooding.	Severe: moderately permeable in upper part of profile; moderately rapid permeability below a depth of 4 feet; excessive seepage likely; subject to flooding.
Natural drainage is adequate.	Rapid intake rate; moderate permeability; moderate available water capacity; sand below a depth of 2 to 3 feet.	Where exposed, the sandy substrata are highly erodible and difficult to vegetate.	Where exposed, the sandy substrata are highly erodible and difficult to vegetate.	Slight: moderately rapidly permeable soil over sand; nearby water supply subject to contamination.	Severe: moderate permeability; sandy texture; excessive seepage.
Natural drainage is adequate.	Medium to slow intake rate; moderate available water capacity; moderately deep rooting zone; slow permeability in fragipan; many areas sloping.	No major construction problems if topography is favorable; exposed fragipan erodes easily and is low in fertility.	Exposed fragipan erodes easily and is low in fertility; difficult to establish sod where fragipan is exposed.	Severe: slow permeability in fragipan.	Moderate where slope is 2 to 7 percent, severe where slope is more than 7 percent; little seepage.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds	
					Reservoir area	Embankments
Belknap: 382	Good in surface layer.	Fair	High water table; subject to flooding; high susceptibility to frost heaving; seepage likely in cuts.	Poor shear strength; low shrink-swell potential; silty bottom land; somewhat poorly drained.	Bottom-land soil; moderate seepage.	Poor stability; poor compaction characteristics; poor resistance to piping.
Blair: 5C2, 5C3, 5D2, 5D3.	Fair in surface layer; poor on eroded slopes.	Poor	High susceptibility to frost heaving; seasonal high water table.	Fair shear strength; moderate shrink-swell potential.	Seasonal high water table; all other features favorable.	Subsoil and substrata have fair to good stability and compaction; good resistance to piping.
Bluford: 13A, 13B, 13B2, 13C2.	Fair in surface layer; fair to poor on eroded slopes.	Poor to fair	High susceptibility to frost heaving; seasonal high water table; plastic subsoil.	Fair shear strength; moderate shrink-swell potential; somewhat poorly drained.	Slight seepage; seasonal high water table.	Subsoil and substrata have fair to good stability and compaction; good resistance to piping.
Bonnie: 108	Fair to poor in surface layer.	Poor to fair	Seasonal high water table; subject to flooding; high susceptibility to frost heaving; some seepage in cuts.	Poor shear strength; low shrink-swell potential; poorly drained; silty bottom land.	Moderate seepage; bottom-land soil.	Poor stability; poor to fair compaction.
Camden: 134A, 134B.	Good in surface layer.	Poor in subsoil, fair to good in substrata.	Moderate susceptibility to frost heaving.	Fair shear strength; moderate shrink-swell potential.	Underlain by stratified material; moderate seepage; sandy below a depth of about 5 feet.	Subsoil and substrata have fair to good stability and compaction.
Chauncey: 287	Good in surface layer.	Subsoil poor, substrata poor to fair.	Subsoil is plastic; highly susceptible to frost heaving; seasonal high water table.	Poor shear strength; moderate to high shrink-swell potential; poorly drained.	Suited to dugout ponds; seasonal high water table; level topography.	Stability and compaction fair in subsoil, fair to poor in substrata.
Cisne: 2	Fair to good in surface layer.	Subsoil poor, substrata poor to fair.	Seasonal high water table; high susceptibility to frost heaving; subsoil is plastic.	Fair shear strength; moderate to high shrink-swell potential; poorly drained.	Suited to dugout ponds; seasonal high water table; level topography.	Fair stability and compaction in subsoil and substrata.

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Seasonal high water table; subject to flooding; moderately slow permeability; drainage can be improved by tile and open ditches.	Subject to flooding; medium to slow intake rate; moderately slow permeability; high available water capacity.	Not needed	Generally not needed; no particular construction problems.	Severe: seasonal high water table; subject to occasional flooding; moderately slow permeability.	Severe: unstable fill and reservoir material; subject to flooding.
Natural drainage is generally adequate; additional drainage needed in some seepy spots.	Medium to slow intake rate; slow permeability; high available water capacity; all areas are sloping.	Slopes are usually short and irregular; exposed subsoil is clayey and low in fertility; unsuitable in most places.	No major construction problems other than low fertility of exposed subsoil.	Severe: seasonal high water table; slow permeability.	Moderate where slope is 4 to 7 percent, severe where slope is more than 7 percent; slope is limiting factor; slight seepage.
Drainage needed in some places; slow permeability; tile does not function well; open ditches are suitable.	Medium to slow intake rate; slow permeability; high available water capacity; some areas are sloping.	Slow permeability; soil wetness causes a problem in terrace channels; no particular construction problems if topography is favorable.	No major construction problems other than low fertility of exposed subsoil.	Severe: seasonal high water table; slow permeability.	Slight where slope is 0 to 2 percent, moderate where slope is 2 to 7 percent; slope is limiting factor; slight seepage.
Poor natural drainage; subject to flooding; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; subject to flooding; high available water capacity; slow permeability.	Not needed	Generally not needed; no particular construction problems.	Severe: high water table; subject to flooding; slow permeability.	Severe: unstable fill and reservoir material; subject to flooding; high water table.
Natural drainage is adequate.	Medium intake rate; moderate permeability; high available water capacity; level areas well suited.	No major construction problems if topography is favorable; generally, slopes are short and irregular.	No major construction problems.	Slight: moderately permeable subsoil.	Severe: rapid permeability in sandy material below a depth of 5 feet; excessive seepage.
Poor natural drainage; slow permeability; tile does not function well; ditches are suitable.	Slow water intake; slow permeability; high available water capacity in rooting zone.	In some places diversions are needed to protect from runoff; no major construction problems.	No major construction problems other than low fertility of subsurface layers.	Severe: slow permeability; seasonal high water table.	Severe: some care is needed in selecting fill material; seasonal high water table.
Poor natural drainage; slow to very slow permeability; tile does not function well; open ditches are suitable.	Slow water intake; slow to very slow permeability; high available water capacity in rooting zone.	Generally not needed; level topography.	No major construction problems except low fertility of subsurface layers.	Severe: high water table; slow to very slow permeability.	Severe: seasonal high water table.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds	
					Reservoir area	Embankments
Coffeen: 428	Good in darker surface layer; fair in lighter colored material below.	Subsoil poor to fair, substrata fair to to good.	Subject to flooding; moderate to high frost heaving susceptibility; seasonal high water table.	Fair shear strength; low shrink-swell potential.	Bottom-land soil; many areas underlain by permeable material; few areas in upper ends of flood plain are only 4 to 5 feet to bedrock.	Poor compaction and stability; poor resistance to piping.
Darwin: 71	Poor: very high clay content.	Poor: very clayey and plastic; unstable on slopes.	Water table is occasionally at surface; slopes are not stable (tend to slump); moderate susceptibility to frost heaving; all horizons plastic when wet; high shrink-swell potential; subject to flooding.	Fair shear strength; high shrink-swell potential; very poorly drained, very clayey bottom land.	Bottom-land soil; high water table; very clayey.	Fair to poor stability and compaction.
Ebbert: 48	Good in surface layer.	Poor	Water table occasionally at surface; high susceptibility to frost heaving; subsoil is plastic.	Fair shear strength; moderate shrink-swell potential; poorly drained.	Suited to dugout ponds; seasonal high water table; level topography.	Fair stability and compaction; good resistance to piping.
Grantsburg: 301B, 301C, 301C2.	Fair in surface layer.	Poor to fair	Cut slopes are erodible; high susceptibility to frost heaving; hillside seeps occur.	Fair shear strength and low to moderate shrink-swell potential in material above bedrock; bedrock is within 5 feet of surface in places.	Depth to bedrock must be checked carefully; considerable seepage possible.	Subsoil has fair to good stability and compaction; substrata has fair to poor stability, compaction, and resistance to piping.
Hickory: 8D2, 8D3, 8E2, 8E3, 8F2.	Good in surface layer; generally contains some small stones; poor on eroded slopes.	Poor to fair	Slopes erodible; moderate susceptibility to frost heaving; likely to seep; somewhat plastic when wet.	Fair shear strength; moderate shrink-swell potential; strongly sloping to steep.	Few gravel pockets; slight seepage in most places.	Fair to good compaction.
Hosmer: 214B, 214C2, 214D2, 214D3, 214E2.	Good to fair in surface layer; poor on eroded slopes.	Poor to fair	Slopes erodible; moderate to high susceptibility to frost heaving; hillside seeps occur.	Fair to poor shear strength; low to moderate shrink-swell potential; lateral seepage in subsoil.	Underlying material variable; normally slight seepage.	Subsoil has fair stability and compaction; substrata silty, and has poor stability, compaction, and resistance to piping.

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Additional drainage needed in places for maximum productivity; tile functions satisfactorily.	Medium intake rate; subject to flooding; moderate permeability; high available water capacity.	Not needed	Generally not needed; no major construction problems.	Severe: subject to occasional to frequent flooding; moderate permeability; few areas in upper ends of flood plains are only 4 to 5 feet to bedrock.	Severe: moderate permeability; unstable fill and reservoir material; subject to flooding; seasonal high water table.
Very poor natural drainage; subject to flooding unless protected; very slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; very slow permeability; high available water capacity; needs drainage and flood protection.	Not needed	Not needed	Severe: high water table; subject to flooding; very slow permeability; plastic clay.	Severe: unstable, clayey and plastic fill material; subject to flooding; high water table.
Poor natural drainage; slow permeability; tile does not function well; surface ditches are suitable.	Slow intake rate; slow permeability; high available water capacity.	Not needed	Not needed	Severe: slow permeability; seasonal high water table.	Severe: seasonal high water table.
Natural drainage is adequate.	Medium intake rate; slow permeability in fragipan; moderate available water capacity; moderately deep rooting zone; gently to moderately sloping.	No major construction problems if topography is favorable; exposed fragipan erodes easily and is low in fertility.	Exposed fragipan erodes easily and is extremely acid and low in fertility; difficult to establish good sod on exposed fragipan.	Severe: slow permeability in fragipan; some areas moderately sloping.	Moderate where slope is 2 to 7 percent; unstable fill material; bedrock may be below depth of 5 feet.
Natural drainage is adequate.	Too sloping for irrigation.	Terraces generally not suited to these irregular or steep slopes.	Channels generally are steep and difficult to vegetate.	Moderate for 8D2 and 8D3, severe for 8E2, 8E3, and 8F2: slope is limiting factor; moderate permeability.	Severe: slopes more than 7 percent.
Natural drainage is generally adequate; hillside seeps occur in some places.	Medium intake rate; slow permeability in fragipan; moderate available water capacity; moderately deep rooting zone; gently sloping to steep.	No major construction problems if topography is favorable; exposed fragipan erodes easily and is low in fertility.	Exposed fragipan erodes easily and is low in fertility; good sod difficult to establish.	Severe: slow permeability in fragipan; some areas strongly sloping.	Moderate where slope is 2 to 7 percent; unstable fill material; severe where slope is more than 7 percent; slight downward seepage.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds	
					Reservoir area	Embankments
Hoyleton: 3A, 3B, 3B2, 3C2.	Good in surface layer; fair to poor on eroded slopes.	Poor	Seasonal high water table; slopes erodible; high susceptibility to frost heaving; plastic subsoil.	Fair shear strength; moderate to high shrink-swell potential; somewhat poorly drained.	Seasonal wetness and high water table.	Fair to good stability and compaction in subsoil and substrata; good resistance to piping.
Huey: 120A, 120B2, 120C3.	Poor in surface layer, poor on eroded slopes; poor physical characteristics and low natural fertility; high sodium content.	Poor: plastic clay; high sodium content.	High water table; very erodible; high susceptibility to frost heaving; plastic subsoil; difficult to establish vegetation; poor physical properties.	Fair shear strength; moderate shrink-swell potential; poorly drained and somewhat poorly drained.	Water likely to be muddy; high sodium content.	Poor stability and compaction; moderate shrink-swell potential.
Lukin: 167	Good in surface layer.	Poor to fair	Seasonal high water table; moderate susceptibility to frost heaving; somewhat plastic subsoil.	Fair shear strength; moderate shrink-swell potential; somewhat poorly drained.	Seasonal wetness and high water table; generally suited to dugout ponds.	Fair to poor stability and compaction in subsoil; fair to poor stability, compaction, and resistance to piping in substrata.
Marissa: 176	Good in surface layer.	Poor in subsoil, poor to fair in substrata.	Seasonal high water table; somewhat plastic subsoil; highly susceptible to frost heaving; slight hazard of flooding.	Fair to poor shear strength; moderate shrink-swell potential; somewhat poorly drained; slight possibility of flooding.	Sandy material 6 to 7 feet below the surface in most places.	Fair to poor compaction and stability in subsoil and substrata; some trouble with piping could occur if substrata are too sandy (normally mixed with fines).
McGary: 173A, 173B2, 173C2, 173C3.	Fair in surface layer, poor on eroded slopes.	Poor: very clayey in subsoil and substrata.	Seasonal high water table; slopes very erodible; high susceptibility to frost heaving; very plastic subsoil and substrata.	Poor shear strength; moderate to high shrink-swell potential; very clayey substrata; somewhat poorly drained.	Clayey substrata are underlain by coarse, permeable material below a depth of 6 to 7 feet in places.	Poor to fair stability and compaction in subsoil and substrata; moderate to high shrink-swell potential; clayey material; highly compressible.
Montgomery: 465.	Poor: high clay content.	Poor: very clayey and plastic throughout subsoil and substrata.	Water table occasionally at surface; plastic throughout; high susceptibility to frost heaving; slight hazard of flooding.	Poor shear strength; moderate to high shrink-swell potential; poorly drained; slight hazard of flooding.	Suited to dugout ponds; very clayey; high water table; level topography.	Poor compaction and stability to a depth of 4 to 5 feet; fair to poor compaction and stability below that depth; moderate to high shrink-swell potential; highly compressible.

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Additional drainage needed; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; slow permeability; high available water capacity; some areas are sloping.	Slow permeability; in places soil is wet in terrace channels; no special problems of construction if topography is favorable.	No problems other than low fertility of exposed subsoil.	Severe: seasonal high water table; slow permeability.	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 7 percent; slight seepage.
Poor and somewhat poor natural drainage; drainage generally needed in level areas; very slow permeability; tile does not function well; open ditches are suitable.	Slow water intake rate; very slow permeability; low available water capacity; high sodium saturation of clay; surface often wet and puddled; poor physical condition.	Generally not used; poor physical properties because of sodium content, short irregular slopes, and very slow permeability.	Very difficult to establish grass on alkaline subsoil; poor physical properties cause excessive erosion; back filling with acid soil, mulching, netting, and other special treatment needed.	Severe: high water table; very slow permeability; high sodium content.	Moderate: unstable fill material; high sodium content in subsoil and substrata; slight seepage.
Some additional drainage is needed in places; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; slow permeability; high available water capacity.	In some places diversions are needed to protect this soil from hill water runoff; no major construction problems.	No problems other than low fertility of exposed subsoil.	Severe: seasonal high water table; slow permeability.	Slight: in places receives water from adjacent slopes; some care needed in selecting fill material.
Additional drainage is needed in places for maximum productivity; tile functions satisfactorily.	Medium intake rate; moderate to moderately slow permeability; high available water capacity; fertile.	Generally not needed.	No major construction problems.	Severe: seasonal high water table; moderate to moderately slow permeability.	Moderate: sandy substrata at a depth of 6 to 7 feet; rapid permeability; shallow sand pockets in places; limitations are less severe if reservoir bottom is in upper 3 to 4 feet of soil.
Additional drainage needed in places; very slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; very slow permeability; moderate available water capacity; some areas are sloping.	Slopes are short and irregular; where exposed, the heavy clay subsoil and substrata have poor physical properties and vegetation is difficult to establish.	Exposed heavy clay causes difficulty in preparing seedbed and establishing vegetation.	Severe: seasonal high water table; very slow permeability.	Moderate where slope is 0 to 7 percent, severe where slope is more than 7 percent; unstable fill material; coarse, permeable material at depth of 6 to 7 feet in places.
Poor natural drainage; slow permeability; tile does not function well; open ditches are suited; tiled with adjacent soils in some places and function satisfactorily.	Wet depressional areas; slow permeability; needs drainage; slow intake rate; high available water capacity; some areas subject to local flooding.	Not needed	Not needed	Severe: high water table; local flooding; slow permeability; very clayey.	Severe; subject to local flooding; seasonal high water table.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds: Reservoir area	Farm ponds: Embankments
Newberry: 218	Good in surface layer.	Poor	Seasonal high water table; somewhat plastic subsoil; highly susceptible to frost heaving.	Fair shear strength; moderate shrink-swell potential; poorly drained.	Suited to dugout ponds; seasonal high water table; level topography.	Fair to good stability and compaction in subsoil and substrata; good resistance to piping.
Patton: 142	Fair to good in surface layer: somewhat clayey.	Poor	Seasonal high water table; slight possibility of flooding; somewhat plastic when wet; high susceptibility to frost heaving.	Fair to poor shear strength; moderate shrink-swell potential; poorly drained; slight hazard of flooding.	Suited to dugout ponds; high water table; level topography; hazard of flooding.	Stability and compaction fair to poor in subsoil; fair in substrata; generally good resistance to piping in substrata.
Petrolia: 288	Fair to poor: somewhat clayey.	Poor	Water table occasionally at surface; plastic when wet; high susceptibility to frost heaving; subject to flooding.	Fair shear strength; moderate shrink-swell potential; poorly drained; clayey bottom land.	Bottom-land soil; subject to flooding unless protected; seasonal high water table; generally suitable for dugout ponds.	Fair stability and fair to poor compaction.
Racoon: 109	Fair in surface layer; low in organic-matter content.	Poor	Seasonal high water table; plastic subsoil; high susceptibility to frost heaving; some areas subject to flooding.	Fair to poor shear strength; moderate shrink-swell potential; poorly drained; some areas subject to flooding.	Suited to dugout ponds; seasonal high water table; level topography.	Stability and compaction fair in subsoil, fair to poor in substrata; resistance to piping good in substrata.
Reesville: 723A, 723B, 723C2.	Good in surface layer.	Poor in subsoil, poor to fair in substrata.	Moderate to high susceptibility to frost heaving.	Fair to poor shear strength; moderate shrink-swell potential; somewhat poorly drained.	Variable texture of underlying material.	Fair stability and compaction in subsoil; fair to poor compaction, stability, and resistance to piping in substrata.
Richview: 4B, 4C2.	Good in surface layer.	Poor in subsoil, poor to fair in substrata.	Moderate susceptibility to frost heaving; subsoil is somewhat plastic.	Fair shear strength; moderate shrink-swell potential.	All other features favorable if topography is suitable.	Fair to good stability, compaction, and resistance to piping in subsoil and substrata.
Robbs: 335B, 335C2.	Fair in surface layer; fair to poor on eroded slopes.	Poor in subsoil, poor to fair in substrata.	Seasonal high water table; high susceptibility to frost heaving; subsoil is somewhat plastic.	Fair shear strength; moderate shrink-swell potential; somewhat poorly drained.	Depth to bedrock is a limitation in places; other features favorable if topography is suitable.	Stability and compaction fair to good in subsoil, fair in substrata.

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Poor natural drainage; slow permeability; tile does not function well; open ditches are suited.	Slow intake rate; slow permeability; high available water capacity.	Not needed	Generally not needed; no special construction problems.	Severe: high water table; slow permeability.	Severe: seasonal high water table.
Poor natural drainage; moderate to moderately slow permeability; tile functions satisfactorily.	Medium intake rate; moderate to moderately slow permeability; high available water capacity; fertile.	Not needed	Generally not needed; no major construction problems other than seasonal wetness.	Severe: seasonal high water table; clayey; moderate to moderately slow permeability; hazard of flooding.	Severe: moderate permeability in some places; seasonal high water table; subject to flooding in some places.
Poor natural drainage; subject to flooding unless protected; moderately slow permeability; tile does not function well; open ditches are suited.	Slow intake rate; moderately slow permeability; high available water capacity; needs drainage and protection from flooding.	Not needed	Generally not needed; no major construction problems.	Severe: moderately slow permeability; subject to flooding; seasonal high water table.	Severe: seasonal high water table; subject to flooding.
Poor natural drainage; local flooding; slow permeability; tile does not function well; open ditches are suited.	Slow intake rate; slow permeability; high available water capacity.	In some places diversions are needed to protect this soil from runoff; no major problems of construction.	Generally not needed; no major construction problems other than wetness in spring.	Severe: slow permeability; seasonal high water table; local flooding.	Severe: care is needed in selecting fill material; seasonal high water table.
Additional drainage needed in some level areas; surface drainage generally most practical.	Medium intake rate; moderately slow permeability; high available water capacity; some areas are sloping.	Short, irregular slopes; soil characteristics are favorable for construction.	No major construction problems.	Severe: moderately slow permeability in subsoil; seasonal high water table.	Moderate: moderate to moderately rapid permeability at 3½ to 4 feet below surface; 2 to 7 percent slopes.
Natural drainage is adequate.	Medium to slow intake rate; moderately slow permeability; high available water capacity; gently to moderately sloping.	No major construction problems if topography is favorable.	No major construction problems.	Severe: moderately slow permeability; sloping.	Moderate: 2 to 7 percent slopes; slight seepage.
Additional drainage needed in some places; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; slow permeability; high available water capacity; gently to moderately sloping.	Slow permeability; soil is wet in terrace channels; no major construction problems if topography is favorable.	No problems other than low fertility of exposed subsoil.	Severe: slow permeability; seasonal high water table; sloping.	Moderate: 2 to 7 percent slopes; slight seepage.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds	
					Reservoir area	Embankments
Sexton: 208	Fair in surface layer; low organic-matter content.	Poor in subsoil, poor to fair in substrata.	Seasonal high water table; high susceptibility to frost heaving in upper 4 feet; subsoil is somewhat plastic.	Fair shear strength; moderate to high shrink-swell potential; poorly drained.	Underlying material variable and permeable enough to allow excessive seepage in many places.	Fair compaction, fair to poor stability in subsoil and substrata.
Shale rock land: 95.	Poor: 1 to 3 feet of clayey material over shale.	Poor: 1 to 3 feet of clayey material over shale.	Shallow to thin-bedded shale and siltstone; unstable material; highly erodible; soil material susceptible to frost heaving.	Thin-bedded shale and siltstone at a depth of 3 feet or less; unstable; strong slopes.	Thin beds of shale and siltstone allow excessive seepage in places; steep.	Poor compaction and stability; inadequate thickness of soil over shale and siltstone.
Sharon: 72	Good in upper 3 to 4 feet, sandy in substrata in some places.	Poor to fair	Subject to flooding; moderate susceptibility to frost heaving.	Poor shear strength; low shrink-swell potential; moderately well drained bottom land.	Underlain by sandy material in most places; excessive seepage; subject to flooding.	Poor stability and compaction; poor resistance to piping.
Stoy: 164A, 164B, 164C2.	Fair to good in surface layer, poor on eroded slopes.	Poor in subsoil, poor to fair in substrata.	Seasonal high water table; slopes erodible; high susceptibility to frost heaving; subsoil is plastic.	Fair to poor shear strength; moderate shrink-swell potential; subject to piping; somewhat poorly drained.	Slight seepage; seasonal high water table; generally favorable sites.	Fair stability and compaction in subsoil; poor stability and poor resistance to piping in substrata.
Tamalco: 581A, 581B2, 581C3.	Fair to poor in surface layer, poor on eroded slopes.	Poor in subsoil, poor to fair in substrata; high sodium content below a depth of 2 feet.	Very plastic in upper part of subsoil, high susceptibility to frost heaving; sodium in lower part of subsoil and substrata gives poor physical properties; erodible.	Fair shear strength; moderate to high shrink-swell potential.	Water is cloudy at times; sodium content in subsoil and substrata.	Fair to poor compaction, stability, and resistance to piping in upper 2 feet; good resistance to piping, fair to good stability and compaction below 2 feet.
Wakeland: 333	Good	Fair	Subject to flooding; seasonal high water table; high susceptibility to frost heaving; some seepage in cuts.	Poor shear strength; low shrink-swell potential; bottom land somewhat poorly drained.	Bottom-land soil subject to flooding; moderate seepage; variable material below a depth of 4 feet; seasonal high water table.	Poor stability and compaction; poor resistance to piping.

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Poor natural drainage; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate in subsoil; slow permeability; high available water capacity.	Not needed	Generally not needed; no major construction problems, except spring wetness.	Severe: slow permeability in subsoil; seasonal high water table.	Severe: rapidly permeable stratified material below a depth of 3½ feetin places.
Natural drainage is adequate.	Too steep for irrigation; poor soil material.	Shallow to shale and siltstone.	Highly erodible and low in fertility; generally steep; channery material exposed by erosion in places.	Severe: strongly sloping to steep; shale and siltstone within 3 feet of surface.	Severe: more than 7 percent slopes; poor material; excessive seepage.
Natural drainage is adequate.	Medium intake rate; moderate permeability; high available water capacity; subject to flooding.	Not needed	Generally not needed; no problem of construction or vegetating.	Moderate: floods infrequently; moderate permeability.	Severe: loamy material; moderately rapid permeability below a depth of 4 feet in places; subject to flooding.
Drainage needed in some areas; slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; slow permeability; high available water capacity; some areas are sloping.	Slow permeability; soil wetness is a problem in terrace channels; no particular construction problems if topography is favorable.	No problems other than low fertility of subsoil.	Severe: seasonal high water table; slow permeability.	Slight where slope is 0 to 2 percent; care needed in selecting fill material; moderate where slope is 2 to 7 percent slight; seepage.
Natural drainage is generally adequate; some small areas need drainage; slow to very slow permeability; surface ditches are suitable.	Slow intake rate; slow to very slow permeability; low to moderate available water capacity; high sodium saturation in lower part of subsoil and substrata.	Generally, slopes are too irregular; exposed subsoil erodes easily.	Erodes easily and is low in fertility; high sodium content; lower part of subsoil and substrata have poor physical properties and are difficult to vegetate.	Severe: slow to very slow permeability; seasonal high water table.	Moderate: poor physical properties in high-sodium part of subsoil and substrata; 2 to 7 percent slopes; slight seepage.
Somewhat poor natural drainage; subject to flooding; moderate permeability; drainage can be improved by tile and open ditches.	Medium intake rate; moderate permeability; high available water capacity; subject to flooding.	Not needed	Generally not needed; no major construction problems.	Severe: seasonal high water table; subject to occasional flooding; moderate permeability.	Severe: unstable fill and reservoir material; subject to flooding.

TABLE 11.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting suitability for—			
	Topsoil	Highway subgrade material	Highway location	Foundations for low buildings	Farm ponds	
					Reservoir area	Embankments
Wellston: 339D3, 339E2, 339E3, 339F2.	Fair in surface layer, poor on eroded slopes; contains some stones or gravel in places.	Poor to fair; bedrock at a depth of 2 to 4 feet.	Shallow to bedrock; stones in upper horizons; slopes erodible; moderate susceptibility to frost heaving.	Dense bedrock generally 2 to 4 feet below surface; strongly sloping to steep.	Bedrock at a depth of 2 to 4 feet; fractured bedrock; rapid seepage.	Fair to poor stability and compaction; depth of soil material over bedrock is only 2 to 4 feet; channery material just above rock.
Wynoose: 12	Fair in surface layer; low in organic-matter content.	Poor: clayey.	Seasonal high water table; slopes erodible; high susceptibility to frost heaving; subsoil is plastic.	Fair shear strength; moderate to high shrink-swell potential; poorly drained.	Suited to dugout ponds; seasonal high water table; level topography.	Fair stability and compaction; fair to good resistance to piping.
Zanesville: 340D2, 340D3, 340E2	Fair in surface layer, poor on eroded slopes; contains some sandstone fragments in places.	Poor to fair; bedrock at a depth of 3 to 6 feet.	Shallow to bedrock; slopes erodible; moderate susceptibility to frost heaving.	Dense rock generally 3 to 6 feet below surface; strongly sloping to steep.	Depth to hard bedrock is a limitation in places; bedrock 3 to 6 feet below surface.	Fragipan material in subsoil unstable; bedrock generally 3 to 6 feet below surface; channery material just above hard rock.

be expected of a soil when the moisture content changes. The shrink-swell potential generally is high in very clayey soils and low in very sandy soils. Generally, a high shrink-swell potential indicates that the soil material is hazardous to use for engineering structures.

Some soils tend to cause corrosion of concrete conduits buried in them. The ratings in table 10 are only estimates of expected corrosivity. Extensive installations that cross soil boundaries or horizons are more likely to be damaged by corrosion than are installations placed entirely in one kind of soil. Because conduits normally are not placed in the surface layer, ratings are not given for that layer.

Engineering interpretations

Table 11 rates the soils in the survey area as a source of topsoil and highway subgrade material, as a location for highway construction, and for foundation of buildings no higher than three stories. Features are listed that affect the use of soils for farm ponds, reservoirs and embankments; for agricultural drainage, irrigation, terraces, diversions, and waterways; and for septic tank filter fields and sewage lagoons.

Soils are rated as poor or only fair as a source of topsoil if they are eroded, are low in organic-matter content or fertility, or have heavy and sticky topsoil that is difficult to handle. Suitability ratings for highway subgrade material are based on the performance of soil material when excavated and used as borrow for highway subgrade. In general, a sandy material containing an adequate binder is the best, because it is least affected by weather conditions and can be worked during a greater number of months. The least desirable materials are plastic clays or organic material.

Because only a few soils in the survey area are sources of sand or gravel, they have not been rated for this use in table 11. The Alvin soils are a source of sand below a depth of 2 to 3 feet, though the sand is generally poorly graded and may contain some fines. In some places the Camden soils have stratified sand and gravel below a depth of 5 feet. In a few places, the Hickory soils contain small, scattered gravel deposits. In places, Marissa soils contain some sand that is generally stratified with finer textured material below a depth of 5 to 6 feet.

Soil features affecting suitability for various engineering practices were selected according to the problems they might cause during construction and maintenance of the structure. The ratings are based on soil features shown for the normal profile of that soil; a variation in the profile at a given site may change the rating.

Highways and other structures can be severely damaged by the shrinking and swelling of underlying soils. Also important are the susceptibility to frost heave and a high water table or flooding. Ratings of shrink-swell potential in the column on foundations for low buildings apply to the subsoil unless stated otherwise.

Table 11 also shows features that affect the installation of structures used for managing water and structures that help control erosion (fig. 12).

interpretations—Continued

Soil features affecting suitability for—Continued				Degree and kind of limitation for use as—	
Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways	Septic tank filter fields	Sewage lagoons
Natural drainage is adequate.	Too sloping for irrigation; shallow to bedrock.	Stoniness and steep slopes.	Difficult to establish sod because of steep slopes and thin soil over bedrock.	Severe: bedrock at a depth of 2 to 4 feet; strongly sloping to steep; shallow; hazard of contamination of local water supply.	Severe: slopes more than 7 percent; bedrock at a depth of 2 to 4 feet.
Poor natural drainage; very slow permeability; tile does not function well; open ditches are suitable.	Slow intake rate; very slow permeability; high available water capacity.	Not needed; level topography.	Generally not needed; some difficulty in establishing grass because of low fertility of subsurface and subsoil; spring wetness.	Severe: high water table; very slow permeability.	Severe: seasonal high water table.
Natural drainage is adequate.	Too sloping for irrigation; shallow to bedrock.	Steep slope and sandstone residuum or bedrock near surface.	Somewhat difficult to establish sod; steep slopes, low fertility, and shallow to bedrock.	Severe: slow permeability; bedrock at a depth of 3 to 6 feet; strongly sloping to steep; hazard of contamination of water supply.	Severe: more than 7 percent slopes; bedrock at a depth of 3 to 6 feet.

Ratings of *slight*, *moderate*, and *severe* are given to show the degree of limitation for sewage disposal. Slight limitations indicate that the soil has no major unfavorable features. Among the features that make a site unfavorable are moderately slow or slow permeability, flooding, a high water table, and steep slopes. Some soils that are underlain by coarse-textured, rapidly permeable material absorb effluent from septic tank disposal fields so rapidly that the effluent reaches underground water supplies before it is completely filtered and thus causes a hazard of contamination.

***Figure 12.*—Shallow surface ditches are needed to drain nearly level claypan soils, such as this Cisne silt loam.**

408-102—72——6

Formation and Classification of Soils

In this section the factors that affected the formation of the soils of Edwards and Richland Counties are discussed and the system of soil classification is explained. Table 12 gives the classification of the soil series by higher categories.

Factors of Soil Formation

The principal factors of soil formation are parent material, climate, plant and animal life, relief and drainage, and time. All five of these factors come into play in the formation of every soil. The relative importance of each factor differs from place to place, and each modifies the effect of the other four. In some cases one factor may dominate the formation of a soil. Man, in such activities as clearing forests and cultivating and fertilizing fields, also changes the course of soil formation, but so far he has had little effect on the overall development of soils in this survey area.

Parent material

The parent materials of the soils of Edwards and Richland Counties mainly were deposited during glacial times. Except in soil association 4 (see the general soil map), the

TABLE 12.—*Classification of soil series*

Soil series	Family	Subgroup	Order
Alford	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Allison	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Alvin	Coarse-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Ava	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Belknap	Coarse-silty, mixed, acid, mesic	Aeric Fluventic Haplaquepts	Inceptisols.
Blair	Fine-loamy, mixed, mesic	Aquic Hapludalfs	Alfisols.
Bluford	Fine, montmorillonitic, mesic	Albaquic Fragiudalfs	Alfisols.
Bonnie	Fine-silty, mixed, acid, mesic	Fluventic Haplaquepts	Inceptisols.
Camden	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Chauncey	Fine, montmorillonitic, mesic	Argiaquic Argialbolls	Mollisols.
Cisne	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Coffeen	Coarse-silty, mixed, mesic	Aquic Fluventic Hapludolls	Mollisols.
Darwin	Fine, montmorillonitic, noncalcareous, mesic	Vertic Haplaquolls	Mollisols.
Ebbert	Fine-silty, mixed, mesic	Argiaquic Argialbolls	Mollisols.
Grantsburg	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Hosmer	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Hoyleton	Fine, montmorillonitic, mesic	Aquollic Hapludalfs	Alfisols.
Huey	Fine-silty, mixed, mesic	Typic Natraqualfs	Alfisols.
Lukin	Fine-silty, mixed, mesic	Aeric Argialbolls	Mollisols.
Marissa	Fine-silty, mixed, mesic	Argiaquic Argialbolls	Mollisols.
McGary	Fine, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Montgomery	Fine, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols.
Newberry	Fine-silty, mixed, mesic	Mollic Ochraqualfs	Alfisols.
Patton	Fine-silty, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols.
Petrolia	Fine-silty, mixed, nonacid, mesic	Fluventic Haplaquepts	Inceptisols.
Racoon	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Reesville	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Richview	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Robbs	Fine-silty, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Sexton	Fine, montmorillonitic, mesic	Typic Ochraqualfs	Alfisols.
Sharon	Coarse-silty, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Stoy	Fine-silty, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Tamalco	Fine, montmorillonitic, mesic	Typic Natrudalfs	Alfisols.
Wakeland	Coarse-silty, mixed, nonacid, mesic	Aeric Fluventic Haplaquepts	Inceptisols.
Wellston [1]	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols.
Wynoose	Fine, montmorillonitic, mesic	Typic Alfaqualfs	Alfisols.
Zanesville	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols.

[1] Wellston soils are taxadjuncts to the series. They have a thinner loess cap and more sandstone fragments near the surface.

uplands were covered with glacial till during the Illinoian glacial period (*12*). Soils developed in this glacial till during the Sangamon interglacial period that followed. Later, during the Wisconsin glacial stage, these soils were covered with loess.

Although the Wisconsin glacier itself did not reach as far south as Edwards and Richland Counties, its melt waters left new deposits of soil material on the flood plains of the Wabash, Embarras, and Little Wabash Rivers. Much of this silty sediment was picked up by the wind and deposited on the uplands as loess.

Loess is the main parent material of the upland soils in the two counties. It ranges from more than 85 inches in thickness near the Wabash River in the southeastern part of Edwards County (soil association 3) (*6*) to about 36 to 48 inches in thickness in the northern part of Edwards County and Richland County (soil associations 1, 2, and 4). The loess is on glacial till in soil associations 1, 2, and 3 and on sandstone residuum or bedrock in association 4. The loess is thin in areas where it accumulated slowly, and, as a result, the soils that formed in it are weathered.

Much of the loess was removed from the steeper soils by erosion, especially in soil associations 2 and 3. The Blair and Hickory soils in these associations developed in Illinoian glacial till.

The soils in associations 6 and 7 along the Wabash, Embarras, and Little Wabash Rivers, are mainly of Wisconsin age and generally are less acid and less weathered than the thinner soils on the uplands. The Sharon, Belknap, and Bonnie soils, however, which are common in the smaller bottom lands of association 7, were derived from sediments washed from acid upland soils. They are not so high in natural fertility as the other bottom-land soils. The Montgomery and Darwin soils in associations 6 and 7 are fine textured, because they were derived from sediments that were high in clay content.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of parent material. The humid-temperate climate of the survey area is conducive to the relatively rapid breakdown of soil minerals, to the formation of clay, and to the movement of these materials downward in the soil profile. Most of the upland soils of the two counties have considerably more clay in the subsoil than in the surface layer.

Plants and animals

Plants have had the main effect on the formation of soils in the survey area, but the animals and organisms that live on and in the soils also have been important.

The changes they bring about depend mainly on the kind of life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, the parent material, relief, and the age of the soil.

Most of the soils of the two counties formed under forest, mainly oak and hickory trees. The soils that formed under prairie grasses have a darker colored surface layer than those that formed under forest, and they are higher in organic-matter content. Prairie vegetation existed on the more nearly level areas of both counties at the time of settlement, but was more extensive in Richland County.

Relief and drainage

Relief influences the amount of runoff, the degree of erosion, and the amount of water infiltrating and percolating through the soil profile. Where the soils formed in uniform, permeable parent material, such as loess, natural drainage is closely associated with slope. The moderately well drained and well drained soils are on the more rolling areas, and the poorly drained soils are on flats or in depressions.

Both Edwards and Richland Counties have rolling areas and steep slopes. Many of the steeper slopes, however, are relatively short. Stream valleys are not deeply entrenched. Richland County mainly has poorly drained, nearly level soils on uplands; Edwards County has nearly level soils on stream terraces and benches.

Time

The length of time necessary for a given soil to develop depends on the other factors of soil formation. Soils formed in parent materials low in lime content develop more rapidly and become acid more readily than soils formed in materials high in lime content. Permeable soils are leached of lime and other soluble minerals much faster than slowly permeable soils. Soils develop faster under forest than under prairie vegetation, because the grasses are more efficient in recycling calcium and other bases from the subsoil to the surface layer. Soils generally develop faster in humid climates than in dry climates. Soils are usually more strongly developed or have greater horizon differentiation because they have been exposed to weathering processes over a long period of time.

Many of the upland soils in the survey area are strongly developed. The thicker loess soils and the soils on terraces and benches, however, are only moderately well developed. Most of the bottom-land soils have weak horizon differentiation or none at all, because there has not been enough time for changes to take place.

Organic matter has accumulated in all the soils. Those developed under prairie vegetation have a thicker, darker colored surface layer than those formed under forest vegetation. In the poorly drained soils, iron compounds have been reduced and moved downward in the profile, causing the subsoil to have a gray color. Some of this iron has accumulated as concretions or small, rounded pellets. In the well-drained soils, the iron compounds are oxidized and are generally more diffuse. They give a brown or yellowish-brown color to the subsoil.

The oldest soils in the survey area formed in Illinoian till on a fairly stable landscape. They were later dissected by streams and probably were resaturated with bases before geologic erosion removed the original cover of loess.

Classification of Soils

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and later revised (*17*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965 and supplemented in March 1967, September 1968, and April 1969 (*19*). This system is under continual study, and readers interested in the development of the system should refer to the latest literature available (*16*).

Table 12 shows the classification of each of the soil series represented in the two counties according to the present system. Shale rock land is not classified. Some of the soils do not fit in a series that has been recognized in the classification system, but recognition of a separate series would not serve a useful purpose. Such soils are named for series they strongly resemble because they differ from those series in ways too small to be of consequence in interpreting their usefulness or behavior. Soil scientists designate such soils as taxadjuncts to the series for which they are named. In this survey soils named in the Wellston series are taxadjuncts to the series.

The current system defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit the grouping of soils that are similar in genesis. The classification is designed to encompass all soils. It has six categories. Beginning with the most inclusive, they are the order, the suborder, the great group, the subgroup, the family, and the series. These are briefly defined in the following paragraphs.

ORDER—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. The four orders represented in Edwards and Richland Counties are Inceptisols, Mollisols, Alfiisols, and Ultisols.

Inceptisols generally develop on young, but not recent, land surfaces. Mollisols usually develop under grass vegetation. They have a thick, dark-colored surface layer called the mollic epipedon. Alfisols are soils that have clay-enriched B horizons that are high in base saturation. Ultisols are soils that have clay-enriched B horizons that are low in base saturation.

SUBORDER—Each order is subdivided into suborders, primarily on the basis of characteristics that seem to produce classes having genetic similarity. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUP—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and other features. The horizons used as a basis for distinguishing between great

groups are those in which clay, iron, or humus has accumulated or those that have pans that interfere with growth of roots or movement of water. The features used are the self-mulching properties of clays, soil temperature, chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP—Great groups are subdivided into subgroups. One represents the central (typic) segment of the group, and others, groups called intergrades, have properties of one great group and also have one or more properties of another great group, suborder, or order. Subgroups may also be made in instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILY—Families are established within a subgroup primarily on the basis of properties that affect the growth of plants or behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile.

Laboratory Data References

Physical and chemical data applicable to a number of soils in Edwards and Richland Counties have been published in other Illinois soil surveys. Data for Alford, Hosmer, Wynoose, Camden, and Darwin soils are given in a publication describing Lawrence County soils (*5*). Data for Alford, Hosmer, Camden, Darwin, and Alvin soils are given in the soil survey of Wabash County (*20*). Some data for Cisne soils, sampled in Jasper County, are on file in the Department of Agronomy, University of Illinois.

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Glossary

Acidity. See Reaction, soil.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Bottom land. Nearly level land on the bottom of a valley that has a stream flowing through it. Subject to flooding and often referred to as a flood plain.

Calcareous soil. A soil that contains enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Conducting field operations such as plowing, planting, cultivating, and harvesting in rows that are at right angles to the natural direction of the slope and as nearly level as practical.

Contour stripcropping. Growing crops in strips that follow the contour or that are parallel to terraces or diversions; strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cover crops. Close-growing crops, grown primarily to improve the soil and protect it between periods of regular crop production; or grown between trees in orchards.

Crop residue. The part of a plant, or crop, left in the field after harvest.

Depth of soil. Thickness of soil over a specified layer, generally one that does not permit the growth of roots. Classes used in this survey are—

Deep—36 inches or more.
Moderately deep—20 to 36 inches.
Shallow—10 to 20 inches.
Very shallow—less than 10 inches.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Escarpment. A long, steep ridge of land or rock that resembles a cliff. It faces in one general direction and separates two areas of more nearly level land.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

First bottoms. The normal flood plain of a stream, part of which may be flooded only infrequently.

Fragipan. A loamy, brittle. subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Glacial till. Unstratified glacial drift that consists of clay, silt, sand, gravel, and boulders transported and deposited by glacial ice.

Green-manure crop. A crop of grasses or legumes worked into the soil while green or soon after maturity to improve soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Infiltration rate. The rate at which water is penetrating the surface of the soil at any given instant, usually expressed in inches per hour. May be limited by either the infiltration capacity of the soil or by the rate at which water is applied to the soil surface.

Leached soil. A soil from which most of the soluble constituents have been removed throughout the entire profile or removed from one part of the profile and accumulated in another part.

Loess. A uniform, silty material transported by wind and deposited on the land.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Native vegetation. The natural vegetation that is found growing in most places on a given soil. In this report only the dominant trees used commercially are listed.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uni-

form color in the A and upper B horizons and have mottling in the lower B and C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in Podzolic soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Organic-matter content. Ratings used in this survey have the following limits: Very low—below 1 percent of volume; low—1 to 2 percent; moderate—2 to 4 percent; and high—more than 4 percent. (These groups were developed for this report with a view that they could be useful generally for soils similar to those covered in the report.)

Outwash, glacial. The material swept out, sorted, and deposited beyond the glacial ice front by streams of melt water. In this county it consists of sediments, in many places sandy and gravelly, deposited in layers on terraces.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to described permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Renovation of pastures. Method for restoring soils used for pasture or hay to higher productivity by cultivating carefully, generally with a field cultivator or similar tool, so that the tillage will not cause erosion. The soil is then limed, fertilized, and reseeded with a suitable mixture of grasses and legumes.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slick spots. Small areas in a field that are slick when wet because they contain excess exchangeable sodium or alkali.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stratified. Composed of or arranged in strata, or layers, such as stratified alluvium. The term is confined to geological materials. Layers in soils that result from the processes of soil formation are called horizons: those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subgrade material. The prepared and compacted soil material below the pavement system; called the "basement soil."

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Subsurface layer. The horizon between the surface layer and the subsoil. Generally the A2 horizon.

Surface layer. A term used in nontechnical soil descriptions for one or more layers above the subsoil. Includes the A horizon and in places part of the B horizon; has no depth limit.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland. Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowland along rivers.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. The physical and chemical disintegration and decomposition of rocks and minerals. Soil is the result of weathering and other chemical, physical, and biological alterations that have changed the upper part of the earth's crust through various periods of time.

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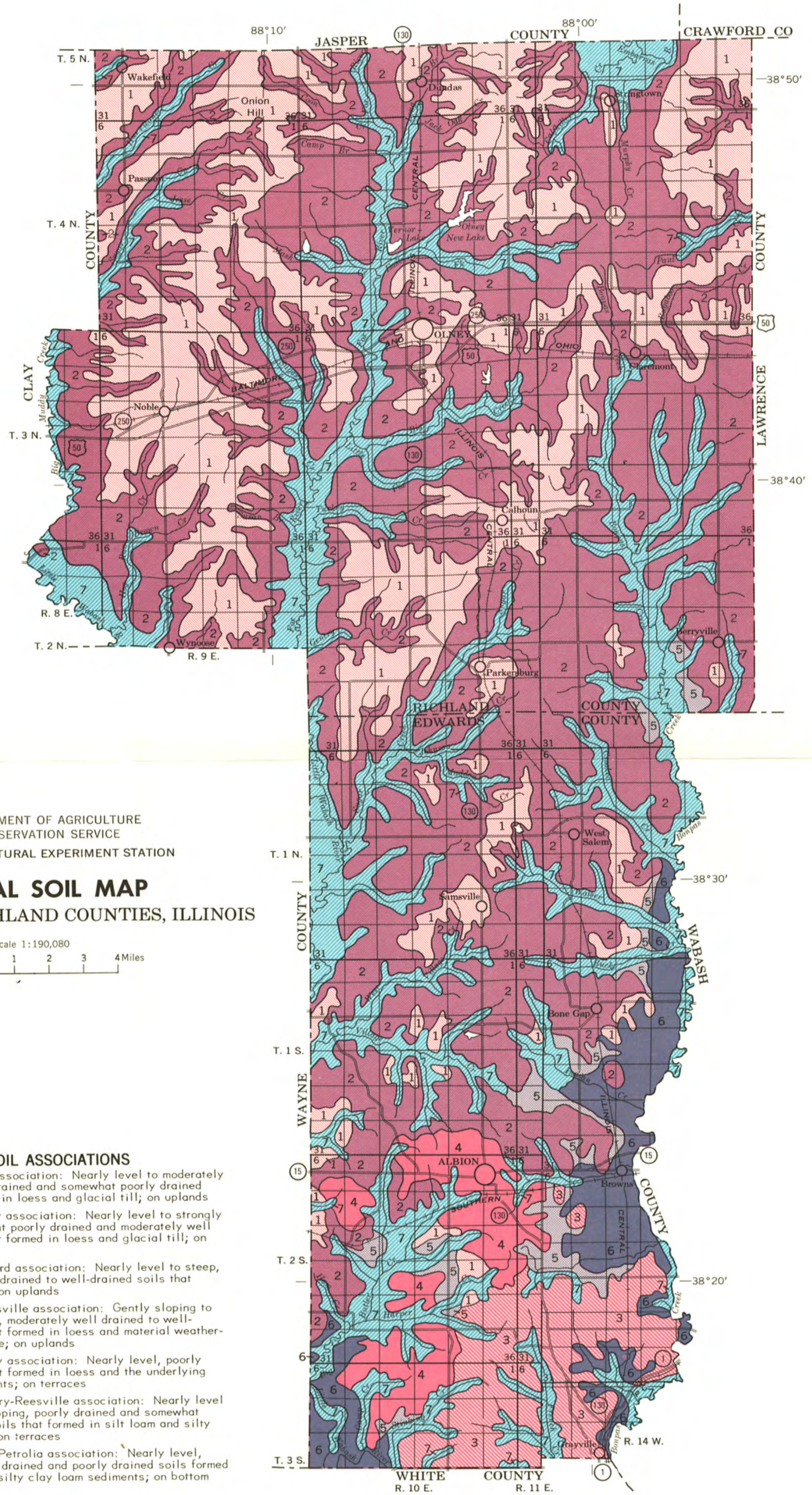


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

EDWARDS AND RICHLAND COUNTIES, ILLINOIS

Scale 1:190,080

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS

1 Cisne-Hoyleton association: Nearly level to moderately sloping, poorly drained and somewhat poorly drained soils that formed in loess and glacial till; on uplands

2 Bluford-Ava-Blair association: Nearly level to strongly sloping, somewhat poorly drained and moderately well drained soils that formed in loess and glacial till; on uplands

3 Hosmer-Stoy-Alford association: Nearly level to steep, somewhat poorly drained to well-drained soils that formed in loess; on uplands

4 Grantsburg-Zanesville association: Gently sloping to moderately steep, moderately well drained to well-drained soils that formed in loess and material weathered from sandstone; on uplands

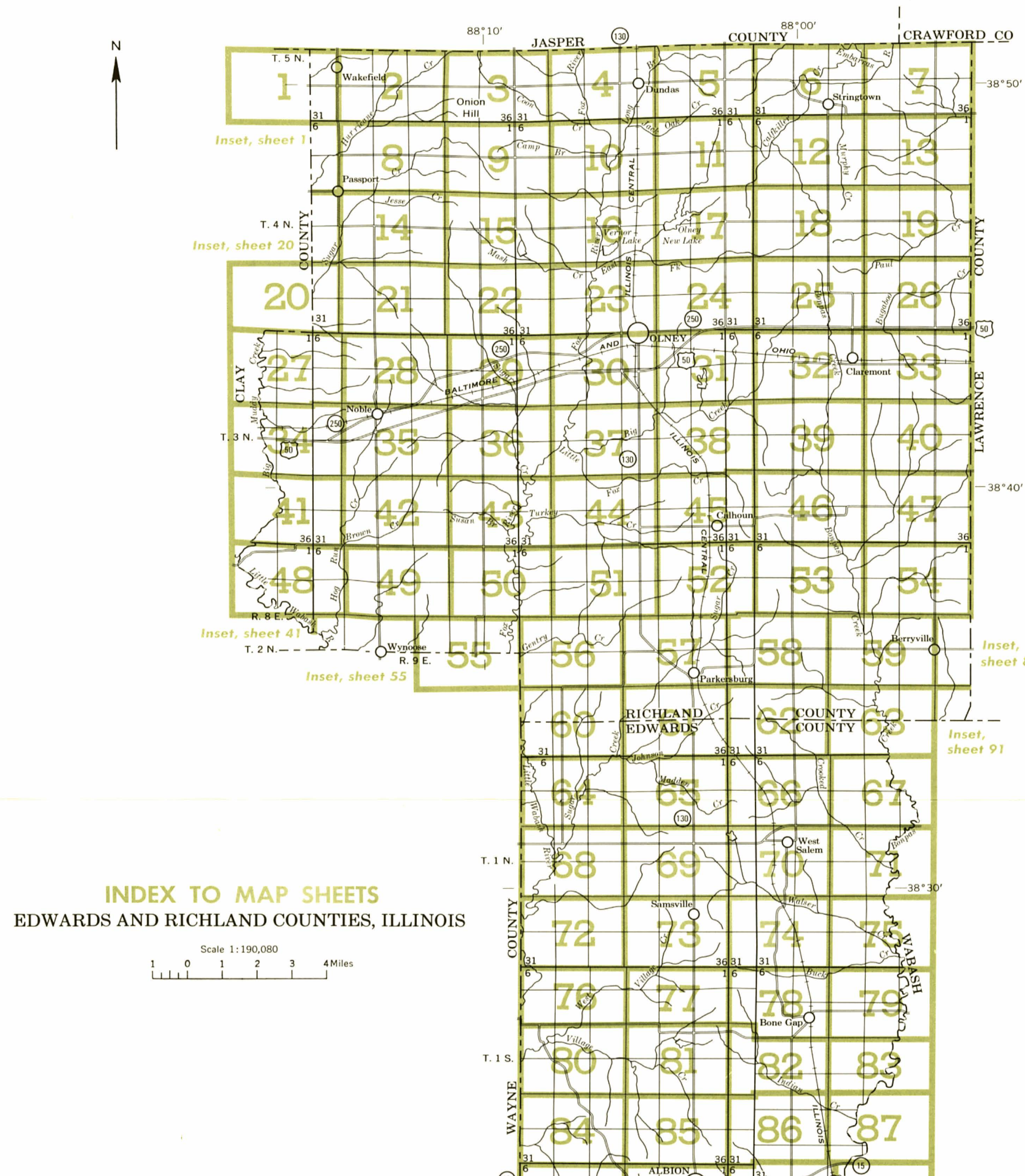
5 Racoon-Chauncey association: Nearly level, poorly drained soils that formed in loess and the underlying silt loam sediments; on terraces

6 Patton-Montgomery-Reesville association: Nearly level to moderately sloping, poorly drained and somewhat poorly drained soils that formed in silt loam and silty clay sediments; on terraces

7 Belknap-Bonnie-Petrolia association: Nearly level, somewhat poorly drained and poorly drained soils formed in silt loam and silty clay loam sediments; on bottom lands

Published 1971

This map is for general planning. It shows only the major soils and does not contain sufficient detail for operational planning.



INDEX TO MAP SHEETS
EDWARDS AND RICHLAND COUNTIES, ILLINOIS
Scale 1:190,080
1 0 1 2 3 4 Miles
N
JASPER COUNTY
CRAWFORD CO
CLAY COUNTY
LAWRENCE COUNTY
RICHLAND COUNTY
EDWARDS COUNTY
WAYNE COUNTY
WABASH COUNTY
WHITE COUNTY
Inset, sheet 1
Inset, sheet 20
Inset, sheet 41
Inset, sheet 55
Inset, sheet 87
Inset, sheet 91
Wakefield
Onion Hill
Dundas
Stringtown
Passport
Olney
Olney New Lake
Vernor Lake
Claremont
Noble
Calhoun
Wynoose
Berryville
Parkersburg
West Salem
Samsville
Bone Gap
Albion
Browns
Grayville
T. 5 N.
T. 4 N.
T. 3 N.
T. 2 N.
T. 1 N.
T. 1 S.
T. 2 S.
T. 3 S.
R. 8 E.
R. 9 E.
R. 10 E.
R. 11 E.
R. 14 W.
88°10′
88°00′
38°50′
38°40′
38°30′
38°20′
BALTIMORE AND OHIO
ILLINOIS CENTRAL
SOUTHERN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

- Highways and roads
  - Dual
  - Good motor
  - Poor motor
  - Trail
- Highway markers
  - National Interstate
  - U. S.
  - State or county
- Railroads
  - Single track
  - Multiple track
  - Abandoned
- Bridges and crossings
  - Road
  - Trail
  - Railroad
  - Ferry (FY)
  - Ford (FORD)
  - Grade
  - R. R. over
  - R. R. under
- Tunnel
- Buildings
  - School
  - Church
- Mine and quarry
- Gravel pit
- Power line
- Pipeline
- Cemetery
- Dams
- Levee
- Tanks
- Well, oil or gas
- Forest fire or lookout station
- Windmill

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

- Streams, double-line
  - Perennial
  - Intermittent
- Streams, single-line
  - Perennial
  - Intermittent
    - Crossable with tillage implements
    - Not crossable with tillage implements
  - Unclassified
- Canals and ditches (CANAL)
- Lakes and ponds
  - Perennial (water, w)
  - Intermittent (int)
- Spring
- Marsh or swamp
- Wet spot
- Alluvial fan
- Drainage end

RELIEF

- Escarpments
  - Bedrock
  - Other
- Prominent peak
- Depressions (Large, Small)
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Contains water most of the time

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Saline spot

SOIL LEGEND

A number shows the soil type or a group of undifferentiated soils. A capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils. A final number 2 after the slope letter indicates an eroded soil; 3, a severely eroded soil.

SYMBOL	NAME	SYMBOL	NAME
2	Cisne silt loam	164C2	Stoy silt loam, 4 to 7 percent slopes, eroded
3A	Hoyleton silt loam, 0 to 2 percent slopes	167	Lukin silt loam
3B	Hoyleton silt loam, 2 to 4 percent slopes	173A	McGary silt loam, 0 to 2 percent slopes
3B2	Hoyleton silt loam, 2 to 4 percent slopes, eroded	173B2	McGary silt loam, 2 to 4 percent slopes, eroded
3C2	Hoyleton silt loam, 4 to 7 percent slopes, eroded	173C2	McGary silt loam, 4 to 10 percent slopes, eroded
4B	Richview silt loam, 2 to 4 percent slopes	173C3	McGary soils, 4 to 10 percent slopes, severely eroded
4C2	Richview silt loam, 4 to 7 percent slopes, eroded	176	Marissa silt loam
5C2	Blair silt loam, 4 to 7 percent slopes, eroded	208	Sexton silt loam
5C3	Blair soils, 4 to 7 percent slopes, severely eroded	214B	Hosmer silt loam, 2 to 4 percent slopes
5D2	Blair silt loam, 7 to 12 percent slopes, eroded	214C2	Hosmer silt loam, 4 to 7 percent slopes, eroded
5D3	Blair soils, 7 to 12 percent slopes, severely eroded	214D2	Hosmer silt loam, 7 to 12 percent slopes, eroded
8D2	Hickory loam, 7 to 12 percent slopes, eroded	214D3	Hosmer soils, 7 to 12 percent slopes, severely eroded
8D3	Hickory soils, 7 to 12 percent slopes, severely eroded	214E2	Hosmer silt loam, 12 to 18 percent slopes, eroded
8E2	Hickory loam, 12 to 18 percent slopes, eroded	218	Newberry silt loam
8E3	Hickory soils, 12 to 30 percent slopes, severely eroded	287	Chauncey silt loam
8F2	Hickory loam, 18 to 30 percent slopes, eroded	288	Petrolia silty clay loam
12	Wynoose silt loam	301B	Grantsburg silt loam, 2 to 4 percent slopes
13A	Bluford silt loam, 0 to 2 percent slopes	301C	Grantsburg silt loam, 4 to 7 percent slopes
13B	Bluford silt loam, 2 to 4 percent slopes	301C2	Grantsburg silt loam, 4 to 7 percent slopes, eroded
13B2	Bluford silt loam, 2 to 4 percent slopes, eroded	306	Allison silty clay loam
13C2	Bluford silt loam, 4 to 7 percent slopes, eroded	308B	Alford silt loam, 2 to 4 percent slopes
14B	Ava silt loam, 2 to 4 percent slopes	308C2	Alford silt loam, 4 to 7 percent slopes, eroded
14B2	Ava silt loam, 2 to 4 percent slopes, eroded	308D2	Alford silt loam, 7 to 16 percent slopes, eroded
14C	Ava silt loam, 4 to 7 percent slopes	308F2	Alford silt loam, 18 to 30 percent slopes, eroded
14C2	Ava silt loam, 4 to 7 percent slopes, eroded	333	Wakeland silt loam
14C3	Ava soils, 4 to 7 percent slopes, severely eroded	335B	Robbs silt loam, 1 to 4 percent slopes
14D2	Ava silt loam, 7 to 12 percent slopes, eroded	335C2	Robbs silt loam, 4 to 7 percent slopes, eroded
48	Ebbert silt loam	339D3	Wellston soils, 7 to 12 percent slopes, severely eroded
71	Darwin silty clay	339E2	Wellston silt loam, 12 to 18 percent slopes, eroded
72	Sharon silt loam	339E3	Wellston soils, 12 to 30 percent slopes, severely eroded
95	Shale rock land	339F2	Wellston silt loam, 18 to 30 percent slopes, eroded
108	Bonnie silt loam	340D2	Zanesville silt loam, 7 to 12 percent slopes, eroded
109	Racoon silt loam	340D3	Zanesville soils, 7 to 12 percent slopes, severely eroded
120A	Huey silt loam, 0 to 2 percent slopes	340E2	Zanesville silt loam, 12 to 18 percent slopes, eroded
120B2	Huey silt loam, 2 to 4 percent slopes, eroded	382	Belknap silt loam
120C3	Huey soils, 2 to 7 percent slopes, severely eroded	428	Coffeen silt loam
131B	Alvin fine sandy loam, 1 to 4 percent slopes	465	Montgomery silty clay
131C2	Alvin fine sandy loam, 4 to 12 percent slopes, eroded	581A	Tamalco silt loam, 0 to 2 percent slopes
134A	Camden silt loam, 0 to 2 percent slopes	581B2	Tamalco silt loam, 2 to 4 percent slopes, eroded
134B	Camden silt loam, 2 to 7 percent slopes	581C3	Tamalco soils, 3 to 7 percent slopes, severely eroded
142	Patton silty clay loam	723A	Reesville silt loam, 0 to 2 percent slopes
164A	Stoy silt loam, 0 to 2 percent slopes	723B	Reesville silt loam, 2 to 4 percent slopes
164B	Stoy silt loam, 2 to 4 percent slopes	723C2	Reesville silt loam, 4 to 7 percent slopes, eroded

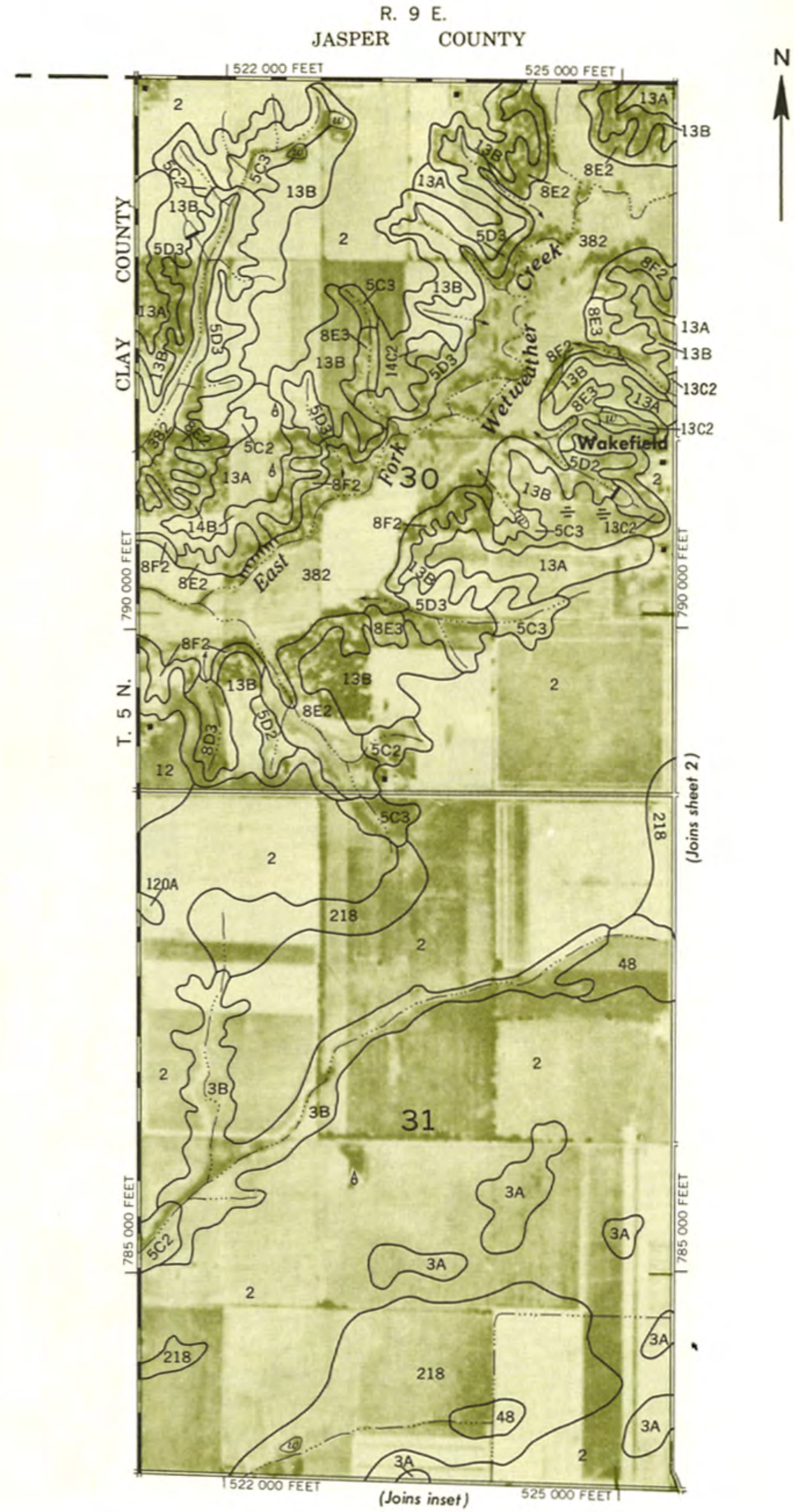
GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs. In referring to management groups, read the introduction to the section it is in for general information about its management. Other information is given in tables as follows:

Acreage and extent, table 4, page 9.
Estimated yields, table 5, page 45.
Woodland suitability groups, table 6, page 48.
Suitability of soils for wildlife, table 7, page 52.
Recreation groups, table 8, page 56.
Engineering use of the soils, tables 9, 10, and 11, pages 58 through 79.

Map symbol	Mapping unit	Described on page	Management group		Woodland suitability group	Recreation group
			Symbol	Page		
2	Cisne silt loam	19	IIIw-1	42	--	9
3A	Hoyleton silt loam, 0 to 2 percent slopes	24	IIw-2	41	--	7
3B	Hoyleton silt loam, 2 to 4 percent slopes	24	IIe-3	40	--	7
3B2	Hoyleton silt loam, 2 to 4 percent slopes, eroded	24	IIIe-1	41	--	7
3C2	Hoyleton silt loam, 4 to 7 percent slopes, eroded	24	IVe-1	43	--	6
4B	Richview silt loam, 2 to 4 percent slopes	32	IIe-1	40	--	5
4C2	Richview silt loam, 4 to 7 percent slopes, eroded	32	IIe-1	40	--	5
5C2	Blair silt loam, 4 to 7 percent slopes, eroded	15	IVe-1	43	4	6
5C3	Blair soils, 4 to 7 percent slopes, severely eroded	15	IVe-1	43	4	6
5D2	Blair silt loam, 7 to 12 percent slopes, eroded	15	IVe-1	43	4	6
5D3	Blair soils, 7 to 12 percent slopes, severely eroded	15	VIe-1	44	4	6
8D2	Hickory loam, 7 to 12 percent slopes, eroded	22	IIIe-2	41	7	2
8D3	Hickory soils, 7 to 12 percent slopes, severely eroded	22	IVe-2	43	7	2
8E2	Hickory loam, 12 to 18 percent slopes, eroded	22	IVe-2	43	7	4
8E3	Hickory soils, 12 to 30 percent slopes, severely eroded	22	VIe-1	44	8	4
8F2	Hickory loam, 18 to 30 percent slopes, eroded	22	VIe-1	44	8	3
12	Wynoose silt loam	38	IIIw-1	42	3	9
13A	Bluford silt loam, 0 to 2 percent slopes	16	IIw-2	41	4	7
13B	Bluford silt loam, 2 to 4 percent slopes	16	IIe-3	40	4	7
13B2	Bluford silt loam, 2 to 4 percent slopes, eroded	16	IIIe-1	41	4	7
13C2	Bluford silt loam, 4 to 7 percent slopes, eroded	16	IVe-1	43	4	6
14B	Ava silt loam, 2 to 4 percent slopes	13	IIe-2	40	6	5
14B2	Ava silt loam, 2 to 4 percent slopes, eroded	13	IIe-2	40	6	5
14C	Ava silt loam, 4 to 7 percent slopes	14	IIIe-3	42	6	5
14C2	Ava silt loam, 4 to 7 percent slopes, eroded	14	IIIe-3	42	6	5
14C3	Ava soils, 4 to 7 percent slopes, severely eroded	14	IVe-3	43	6	6
14D2	Ava silt loam, 7 to 12 percent slopes, eroded	14	IIIe-3	42	6	6
48	Ebbert silt loam	20	IIw-1	40	--	9
71	Darwin silty clay	20	IIIw-2	42	2	10
72	Sharon silt loam	34	I-1	39	1	11
95	Shale rock land	33	VIIs-2	45	10	3
108	Bonnie silt loam	17	IIIw-2	42	2	10
109	Racoon silt loam	30	IIIw-1	42	3	9
120A	Huey silt loam, 0 to 2 percent slopes	25	IVw-1	43	--	9
120B2	Huey silt loam, 2 to 4 percent slopes, eroded	25	IVw-1	43	--	8
120C3	Huey soils, 2 to 7 percent slopes, severely eroded	25	VIe-3	44	--	8
131B	Alvin fine sandy loam, 1 to 4 percent slopes	12	IIe-1	40	7	1
131C2	Alvin fine sandy loam, 4 to 12 percent slopes, eroded	12	IIIe-2	41	7	1
134A	Camden silt loam, 0 to 2 percent slopes	17	I-1	39	7	1
134B	Camden silt loam, 2 to 7 percent slopes	17	IIe-1	40	7	1
142	Patton silty clay loam	29	IIw-4	41	--	9
164A	Stoy silt loam, 0 to 2 percent slopes	35	IIw-2	41	4	7
164B	Stoy silt loam, 2 to 4 percent slopes	35	IIe-3	40	4	7
164C2	Stoy silt loam, 4 to 7 percent slopes, eroded	35	IVe-1	43	4	6
167	Lukin silt loam	26	IIw-2	41	--	7
173A	McGary silt loam, 0 to 2 percent slopes	27	IIIw-1	42	5	7
173B2	McGary silt loam, 2 to 4 percent slopes, eroded	27	IIIe-4	42	5	7
173C2	McGary silt loam, 4 to 10 percent slopes, eroded	28	IIIe-4	42	5	8
173C3	McGary soils, 4 to 10 percent slopes, severely eroded	28	IVe-4	43	5	8
176	Marissa silt loam	27	I-2	39	--	7
208	Sexton silt loam	33	IIIw-1	42	3	9
214B	Hosmer silt loam, 2 to 4 percent slopes	23	IIe-2	40	6	5
214C2	Hosmer silt loam, 4 to 7 percent slopes, eroded	23	IIIe-3	42	6	5
214D2	Hosmer silt loam, 7 to 12 percent slopes, eroded	23	IIIe-3	42	6	6
214D3	Hosmer soils, 7 to 12 percent slopes, severely eroded	23	IVe-3	43	6	6
214E2	Hosmer silt loam, 12 to 18 percent slopes, eroded	23	IVe-3	43	6	4
218	Newberry silt loam	29	IIw-1	40	--	9
287	Chauncey silt loam	18	IIIw-1	42	--	9
288	Petrolia silty clay loam	30	IIIw-2	42	2	10
301B	Grantsburg silt loam, 2 to 4 percent slopes	21	IIe-2	40	6	5
301C	Grantsburg silt loam, 4 to 7 percent slopes	21	IIIe-3	42	6	5
301C2	Grantsburg silt loam, 4 to 7 percent slopes, eroded	21	IIIe-3	42	6	5
306	Allison silty clay loam	12	I-1	39	1	11
308B	Alford silt loam, 2 to 4 percent slopes	11	IIe-1	40	7	1
308C2	Alford silt loam, 4 to 7 percent slopes, eroded	11	IIe-1	40	7	1
308D2	Alford silt loam, 7 to 16 percent slopes, eroded	11	IIIe-2	41	7	2
308F2	Alford silt loam, 18 to 30 percent slopes, eroded	11	VIe-1	44	8	3
333	Wakeland silt loam	36	IIw-3	41	1	11
335B	Robbs silt loam, 1 to 4 percent slopes	33	IIe-3	40	4	7
335C2	Robbs silt loam, 4 to 7 percent slopes, eroded	33	IVe-1	43	4	6
339D3	Wellston soils, 7 to 12 percent slopes, severely eroded	37	VIs-1	44	9	2
339E2	Wellston silt loam, 12 to 18 percent slopes, eroded	37	VIs-1	44	9	4
339E3	Wellston soils, 12 to 30 percent slopes, severely eroded	37	VIIs-1	44	9	4
339F2	Wellston silt loam, 18 to 30 percent slopes, eroded	37	VIIs-1	44	9	3
340D2	Zanesville silt loam, 7 to 12 percent slopes, eroded	38	IVe-3	43	6	6
340D3	Zanesville soils, 7 to 12 percent slopes, severely eroded	38	VIe-2	44	6	6
340E2	Zanesville silt loam, 12 to 18 percent slopes, eroded	38	VIe-2	44	6	4
382	Belknap silt loam	14	IIw-3	41	1	11
428	Coffeen silt loam	19	I-2	39	1	11
465	Montgomery silty clay	28	IIw-4	41	--	9
581A	Tamalco silt loam, 0 to 2 percent slopes	35	IIIs-1	42	--	7
581B2	Tamalco silt loam, 2 to 4 percent slopes, eroded	36	IIIs-1	42	--	7
581C3	Tamalco soils, 3 to 7 percent slopes, severely eroded	36	IVe-4	43	--	8
723A	Reesville silt loam, 0 to 2 percent slopes	31	IIw-2	41	4	7
723B	Reesville silt loam, 2 to 4 percent slopes	31	IIe-3	40	4	7
723C2	Reesville silt loam, 4 to 7 percent slopes, eroded	31	IIIe-1	41	4	6

3000 AND 5000-FOOT GRID TICKS

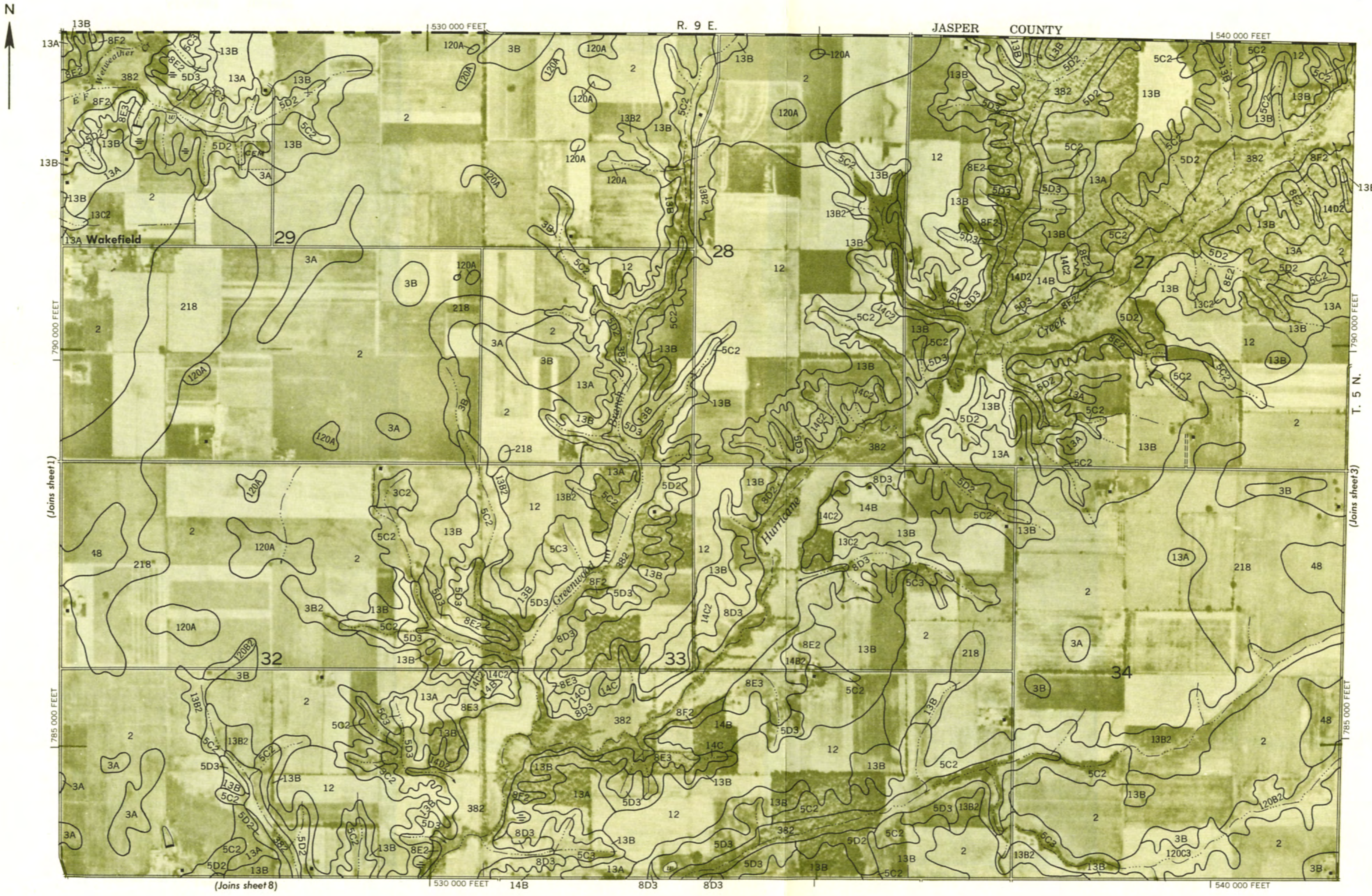


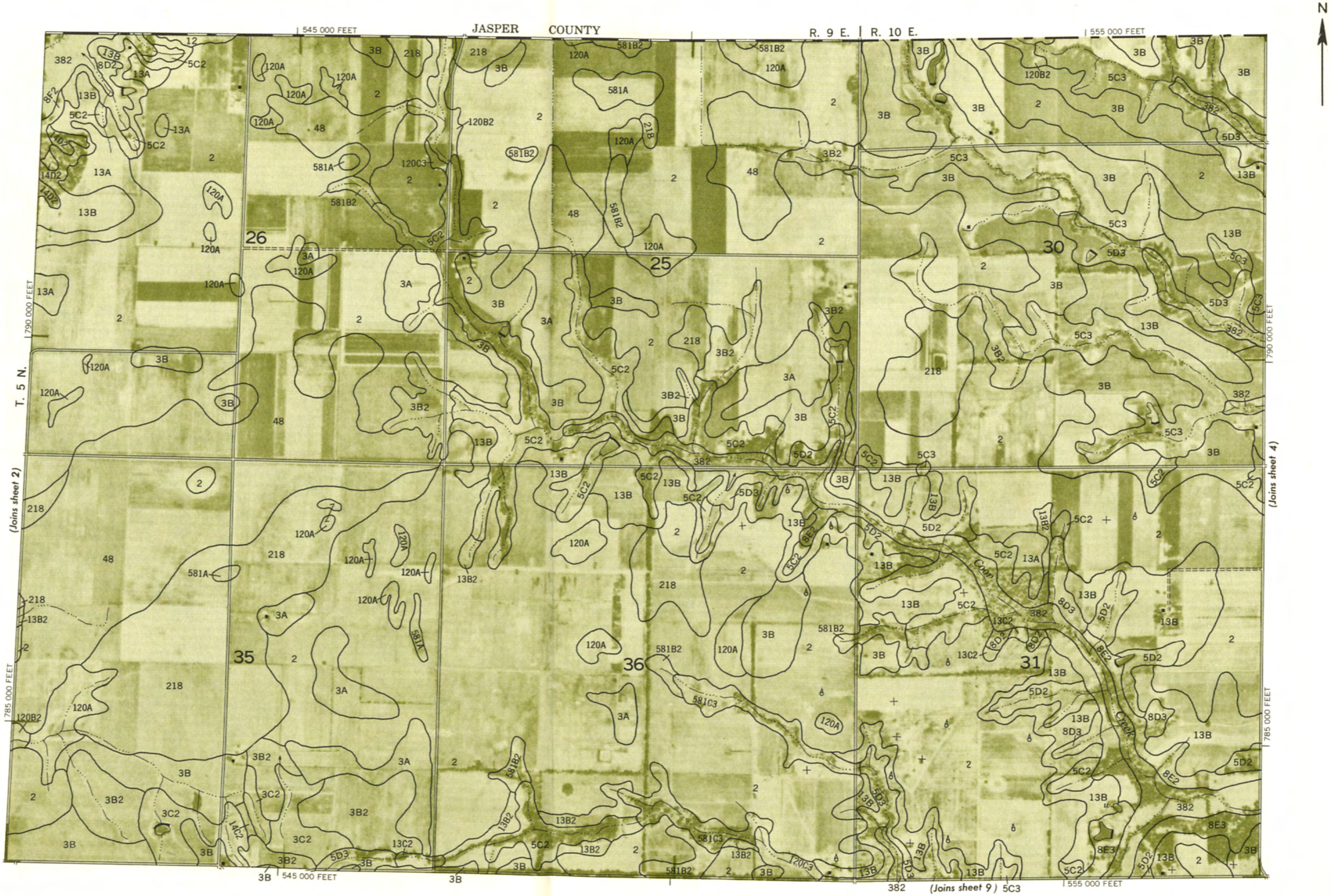
3000 AND 5000-FOOT GRID TICKS

3000 AND 5000-FOOT GRID TICKS

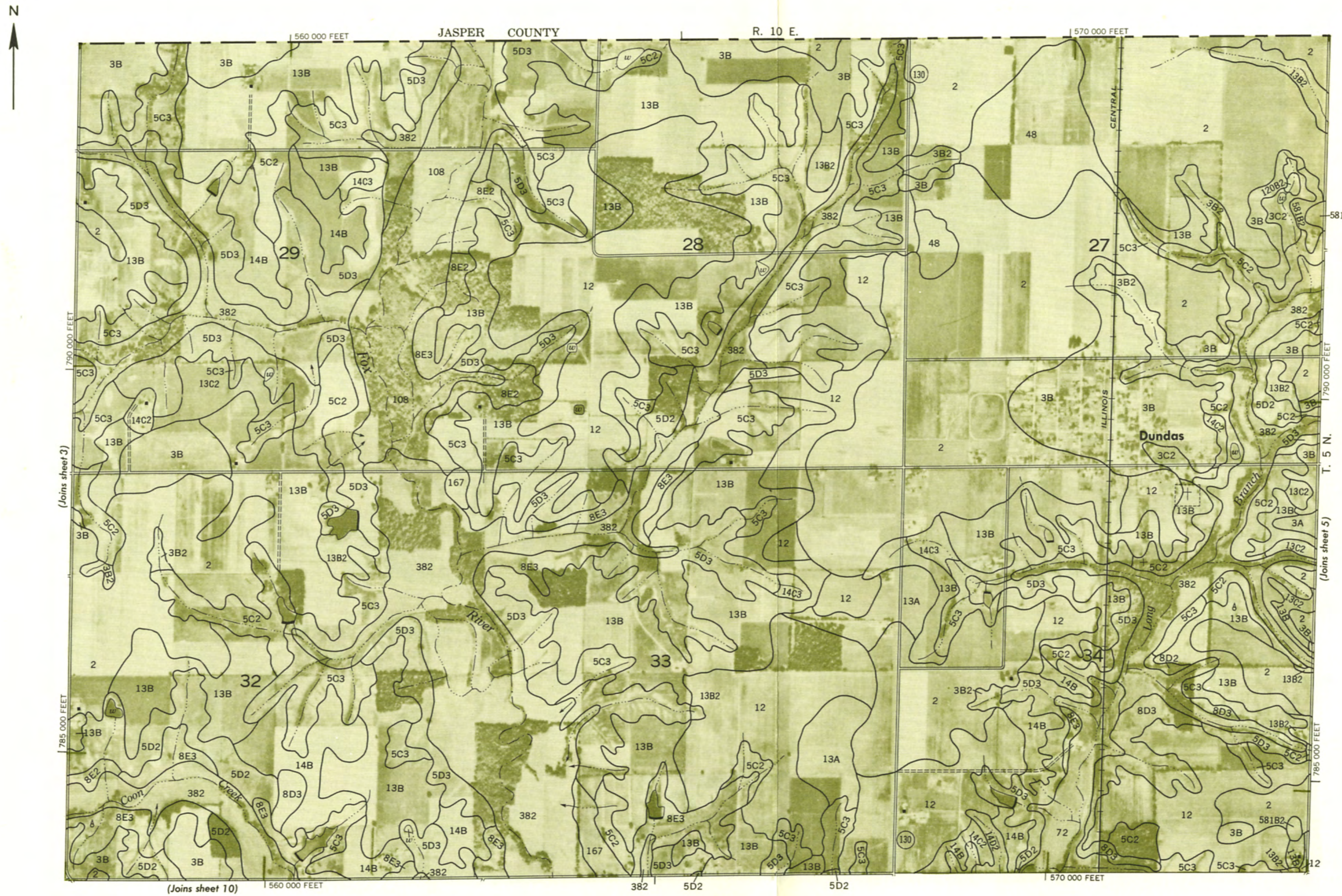
N

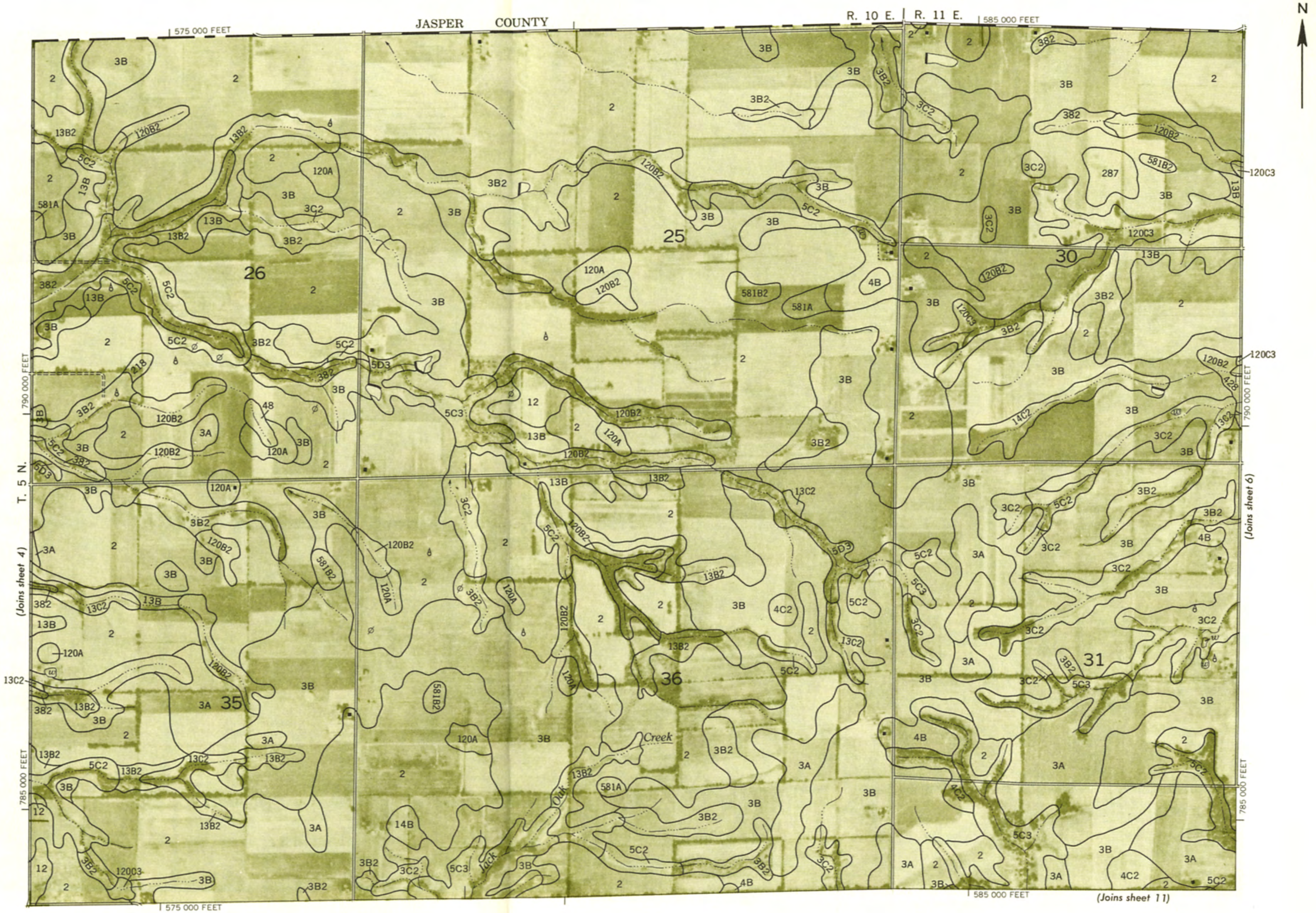
EDWARDS AND RICHLAND COUNTIES, ILLINOIS — SHEET NUMBER 2




N
JASPER COUNTY
545 000 FEET
555 000 FEET
R. 9 E.
R. 10 E.
T. 5 N.
790 000 FEET
785 000 FEET
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 9)
Coon
Creek
25
26
30
31
35
36

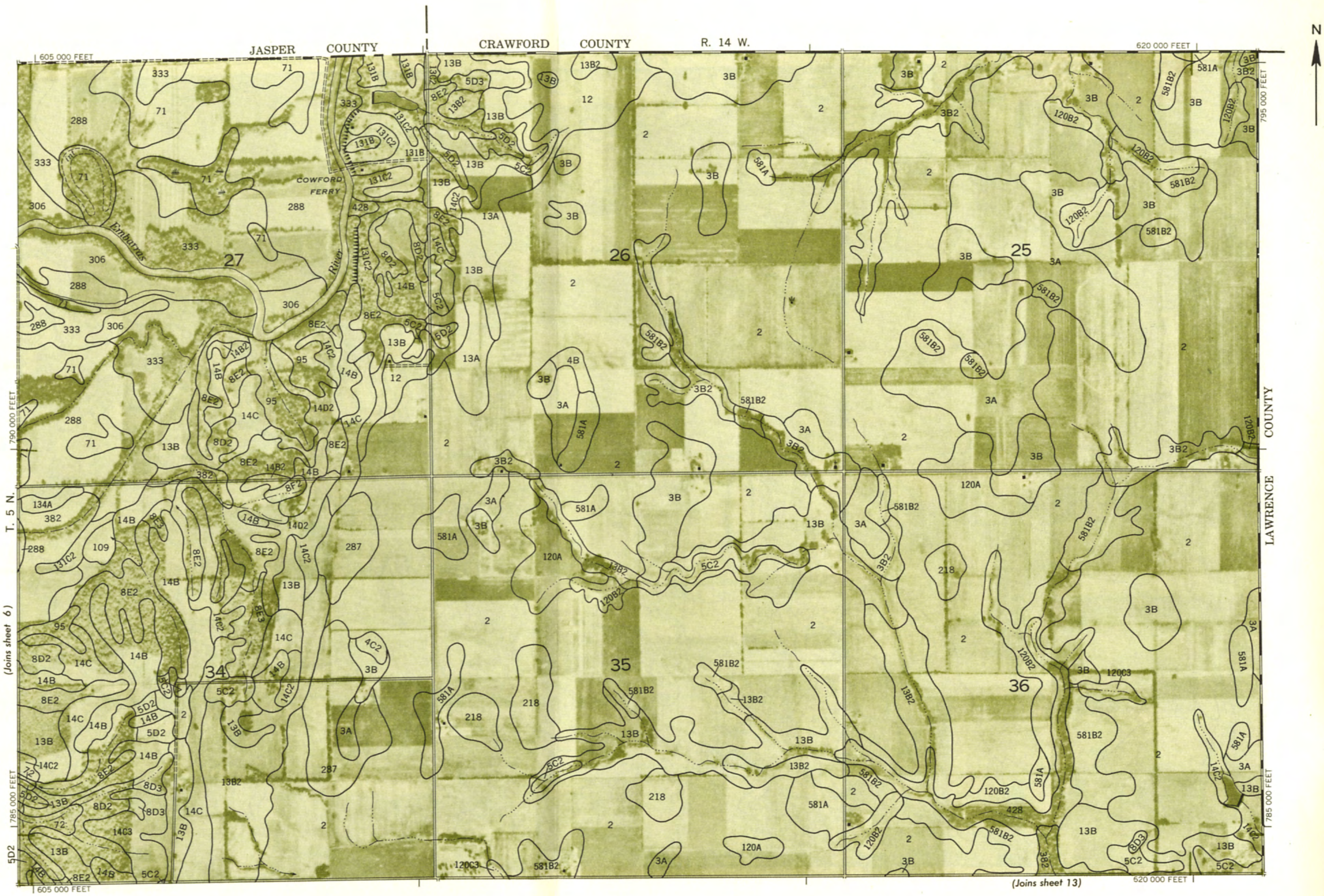
EDWARDS AND RICHLAND COUNTIES, ILLINOIS — SHEET NUMBER 4



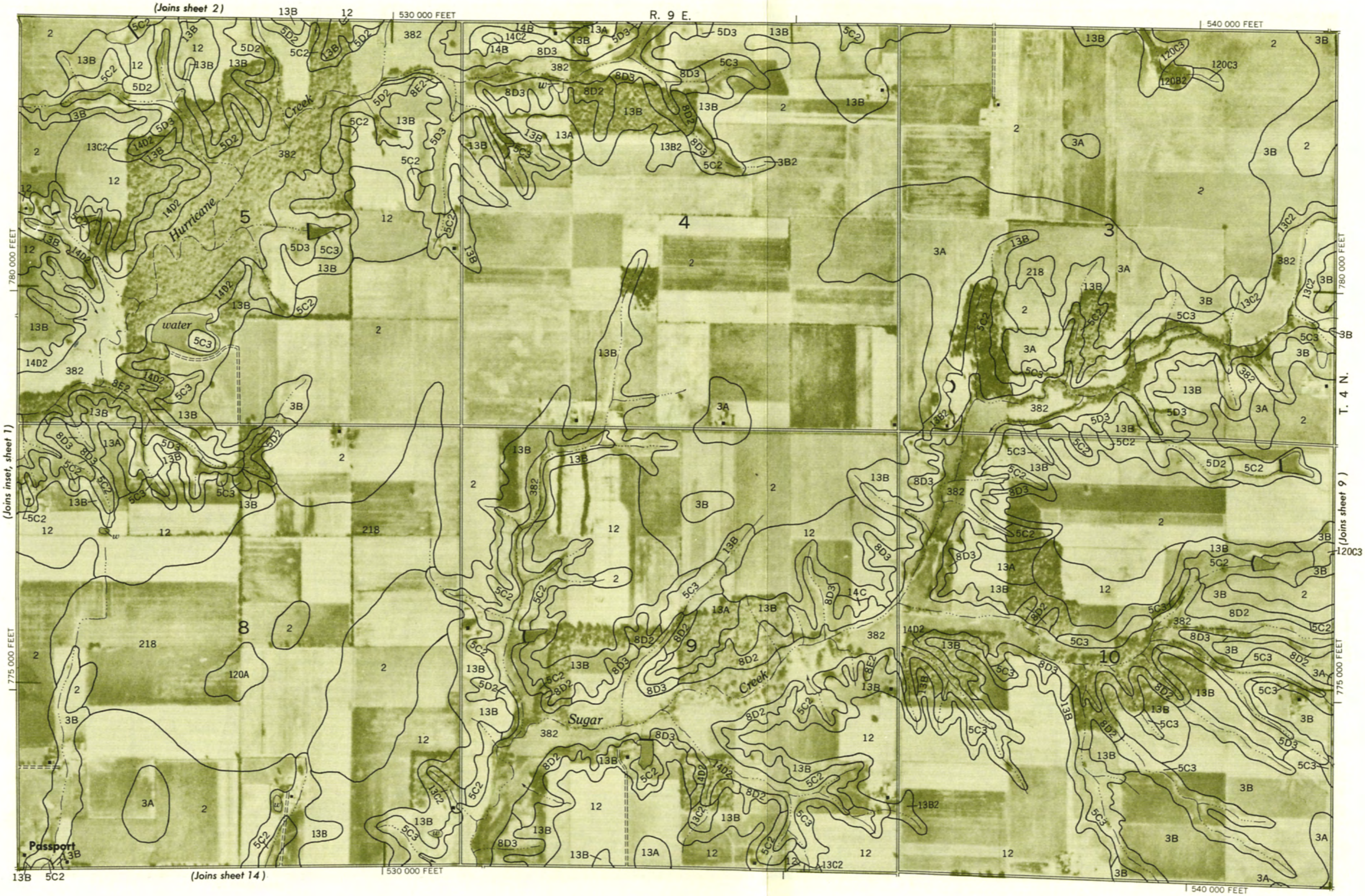

N
JASPER COUNTY
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
790 000 FEET
785 000 FEET
T. 5 N.
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 11)
26
25
30
35
36
31
Creek
Oak
Jack

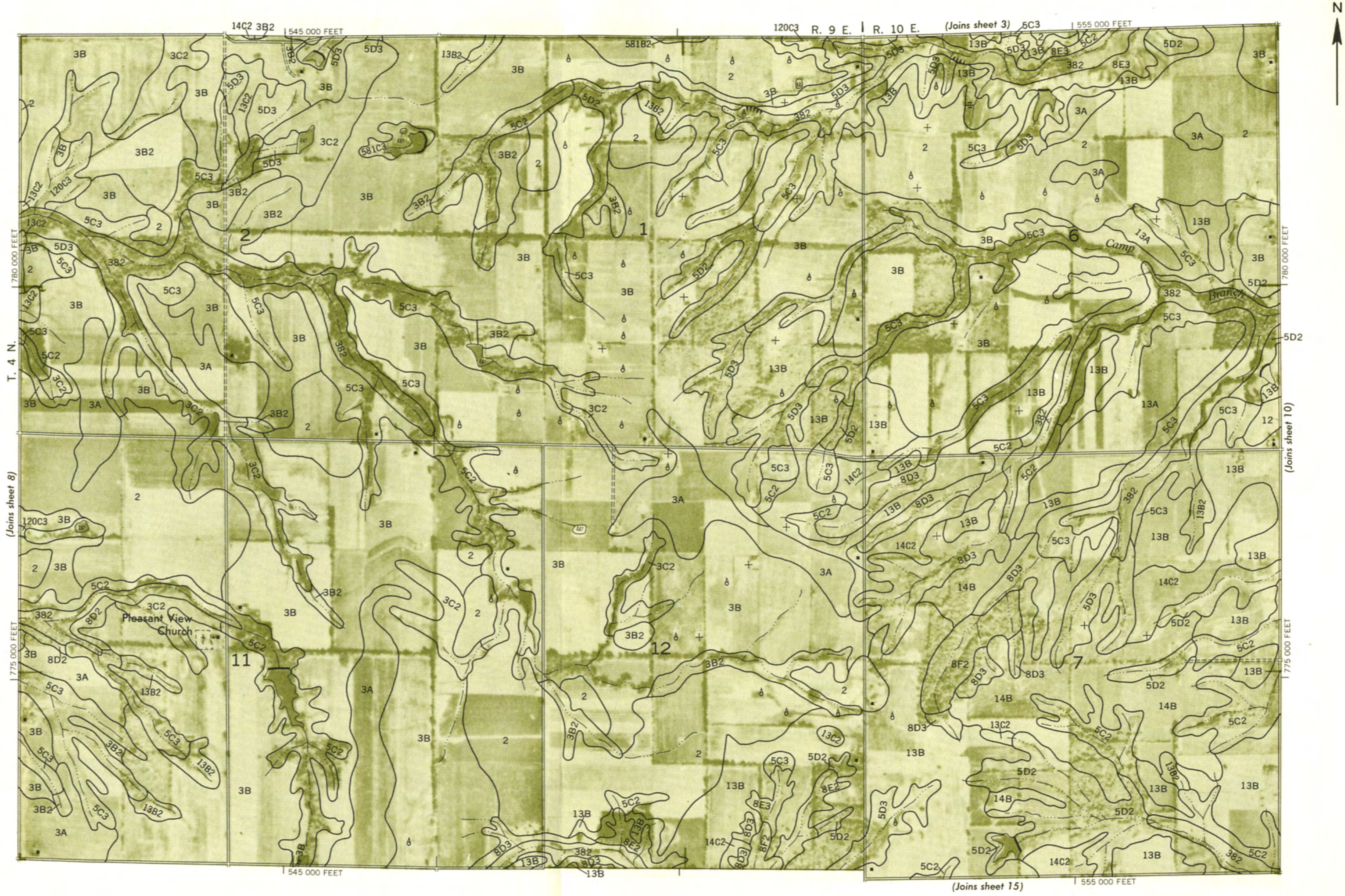
N


590 000 FEET
R. 14 W.
JASPER COUNTY
600 000 FEET
Embarras River
Calfkiller Creek
Murphy Creek
Stringtown
T. 5 N.
790 000 FEET
785 000 FEET
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 12)
28
29
30
31
32
33

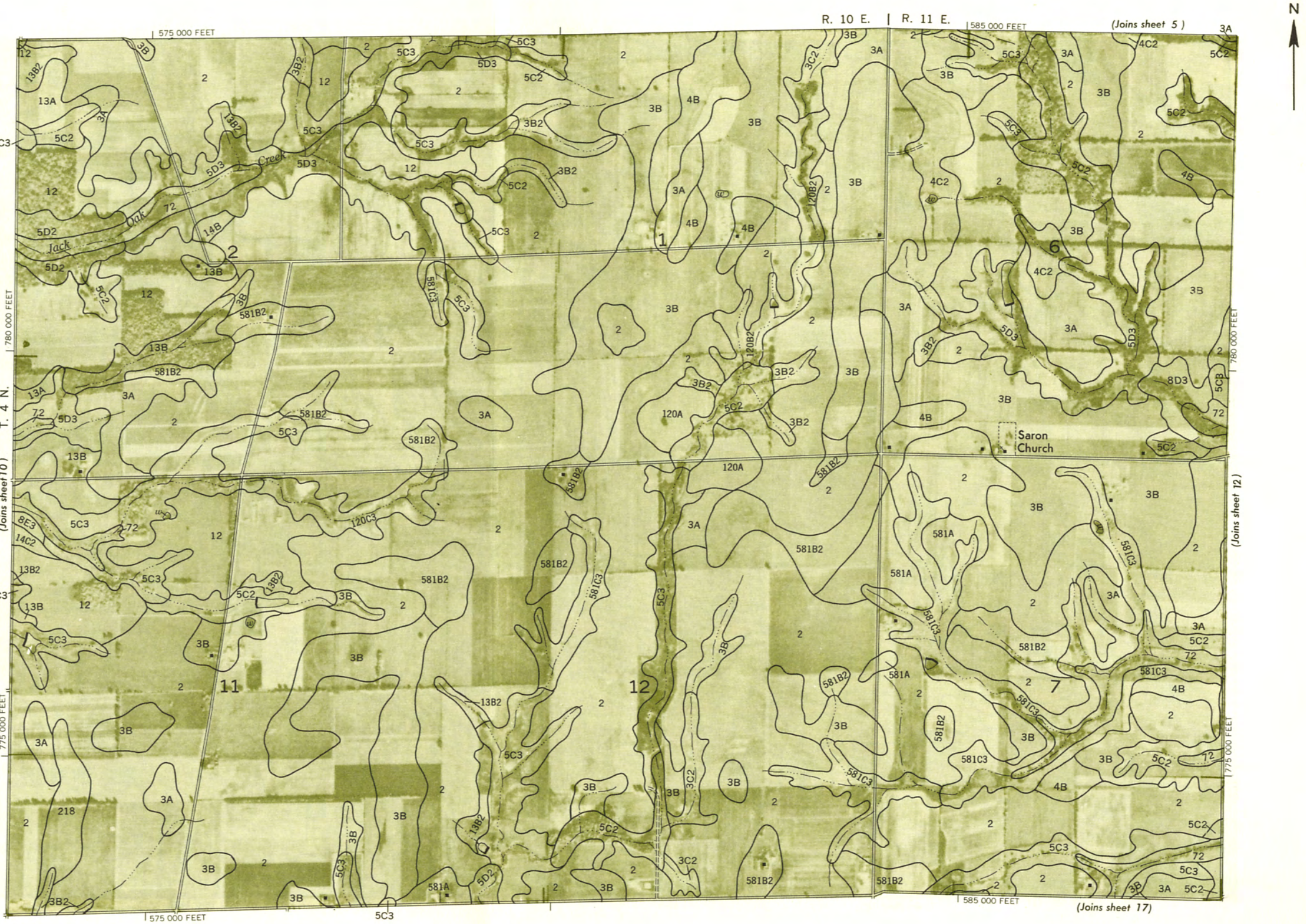

JASPER COUNTY
CRAWFORD COUNTY
R. 14 W.
LAWRENCE COUNTY
T. 5 N.
605 000 FEET
620 000 FEET
795 000 FEET
790 000 FEET
785 000 FEET
(Joins sheet 6)
(Joins sheet 13)
N
COWFORD FERRY
Embarras River
27
26
25
34
35
36

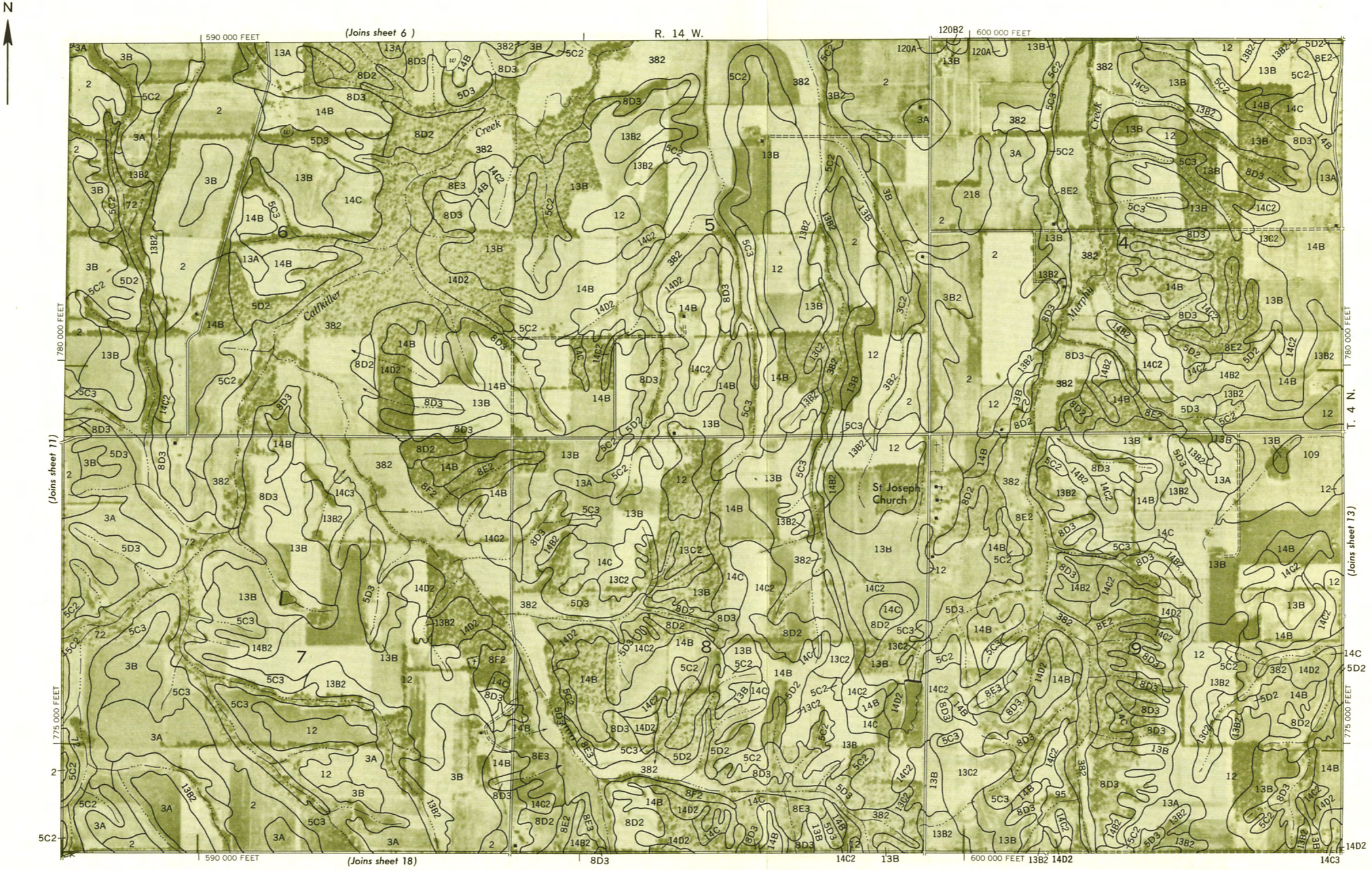
N

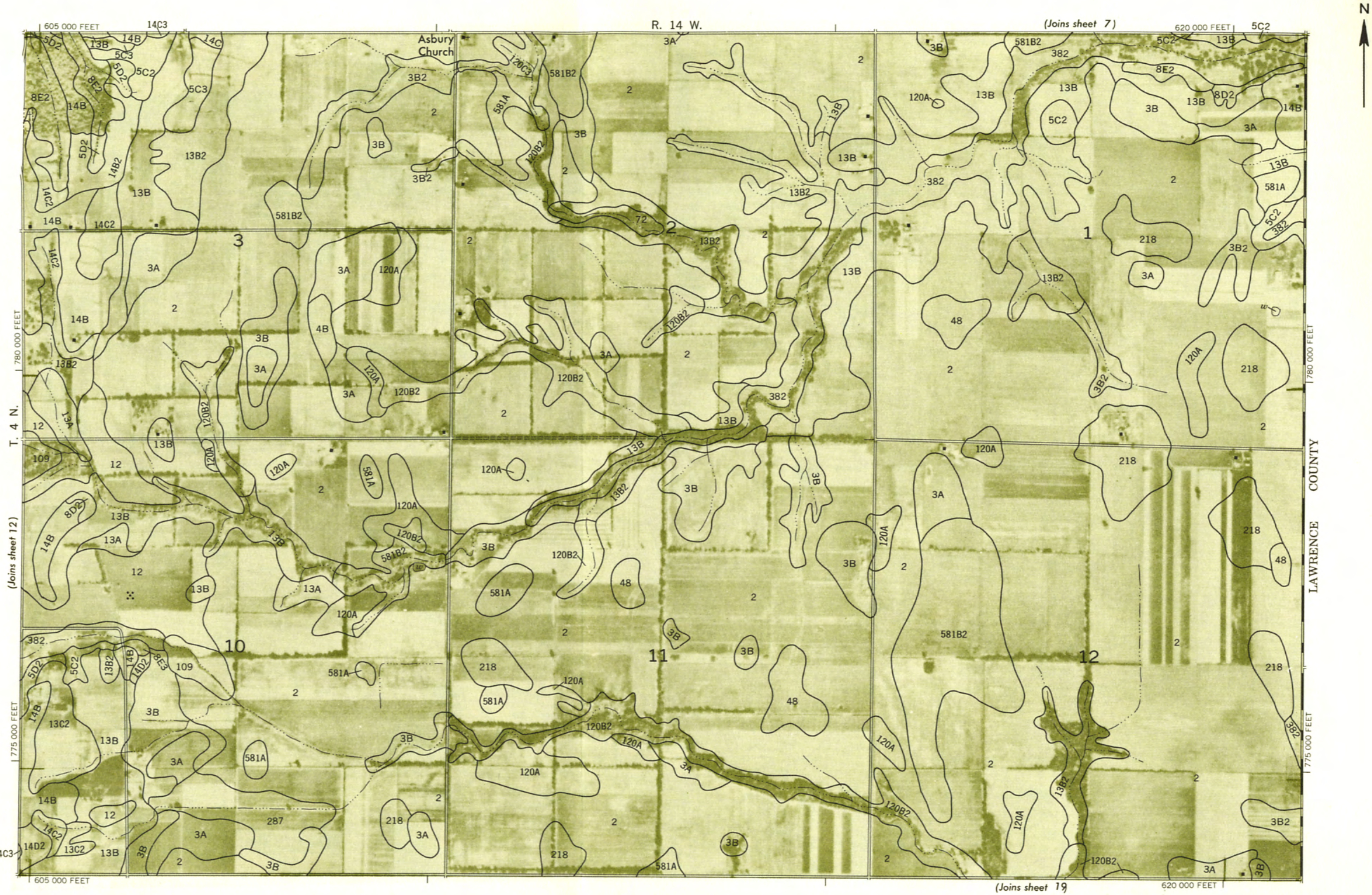

(Joins sheet 2)
530 000 FEET
R. 9 E.
540 000 FEET
780 000 FEET
775 000 FEET
T. 4 N.
(Joins inset, sheet 1)
(Joins sheet 9)
(Joins sheet 14)
Hurricane
Creek
Sugar
Creek
water
Passport
5
4
3
8
9
10

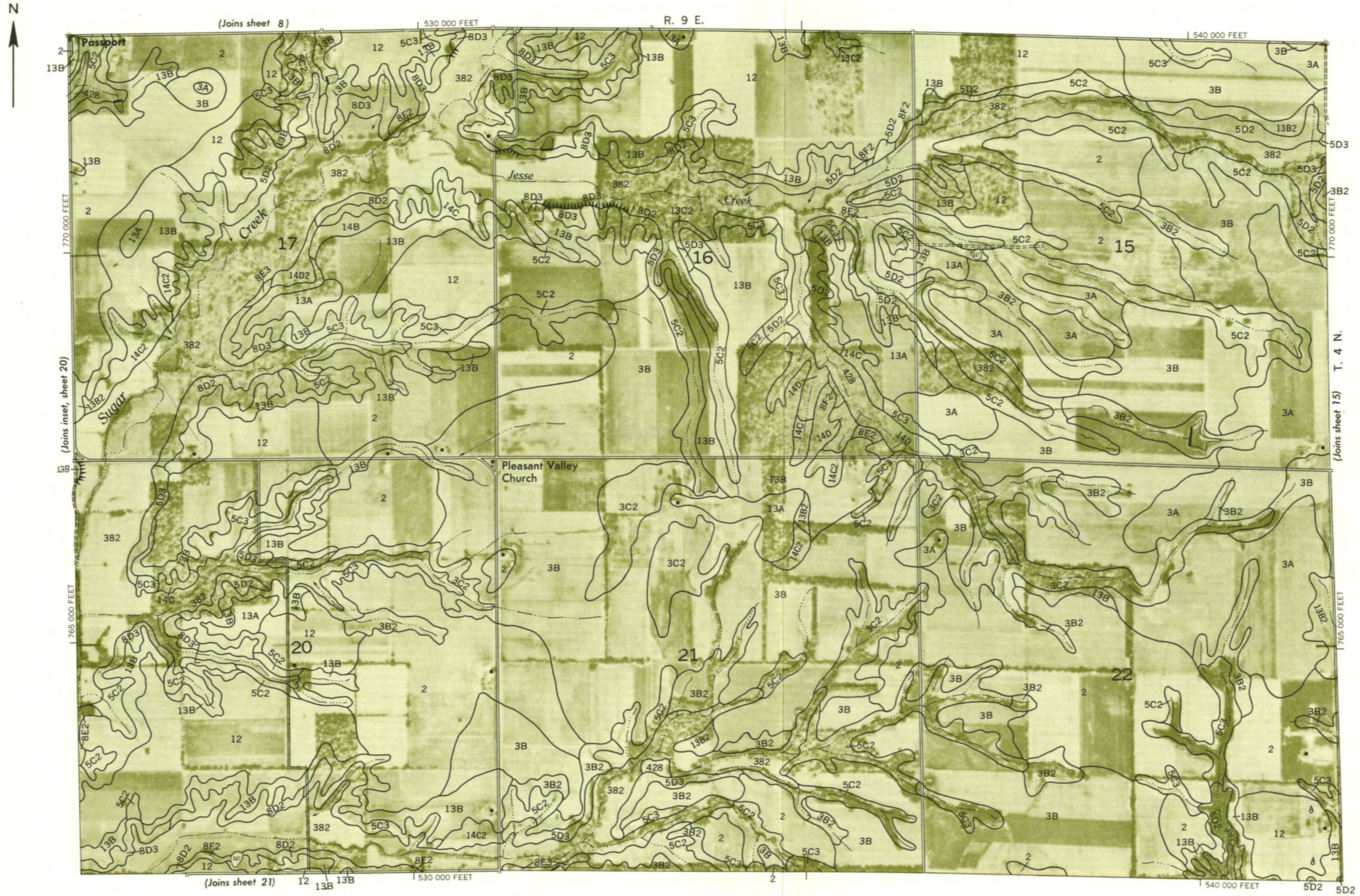

N
R. 9 E.
R. 10 E.
(Joins sheet 3)
545 000 FEET
555 000 FEET
780 000 FEET
775 000 FEET
T. 4 N.
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
Camp Branch
Pleasant View Church
1
2
6
7
11
12

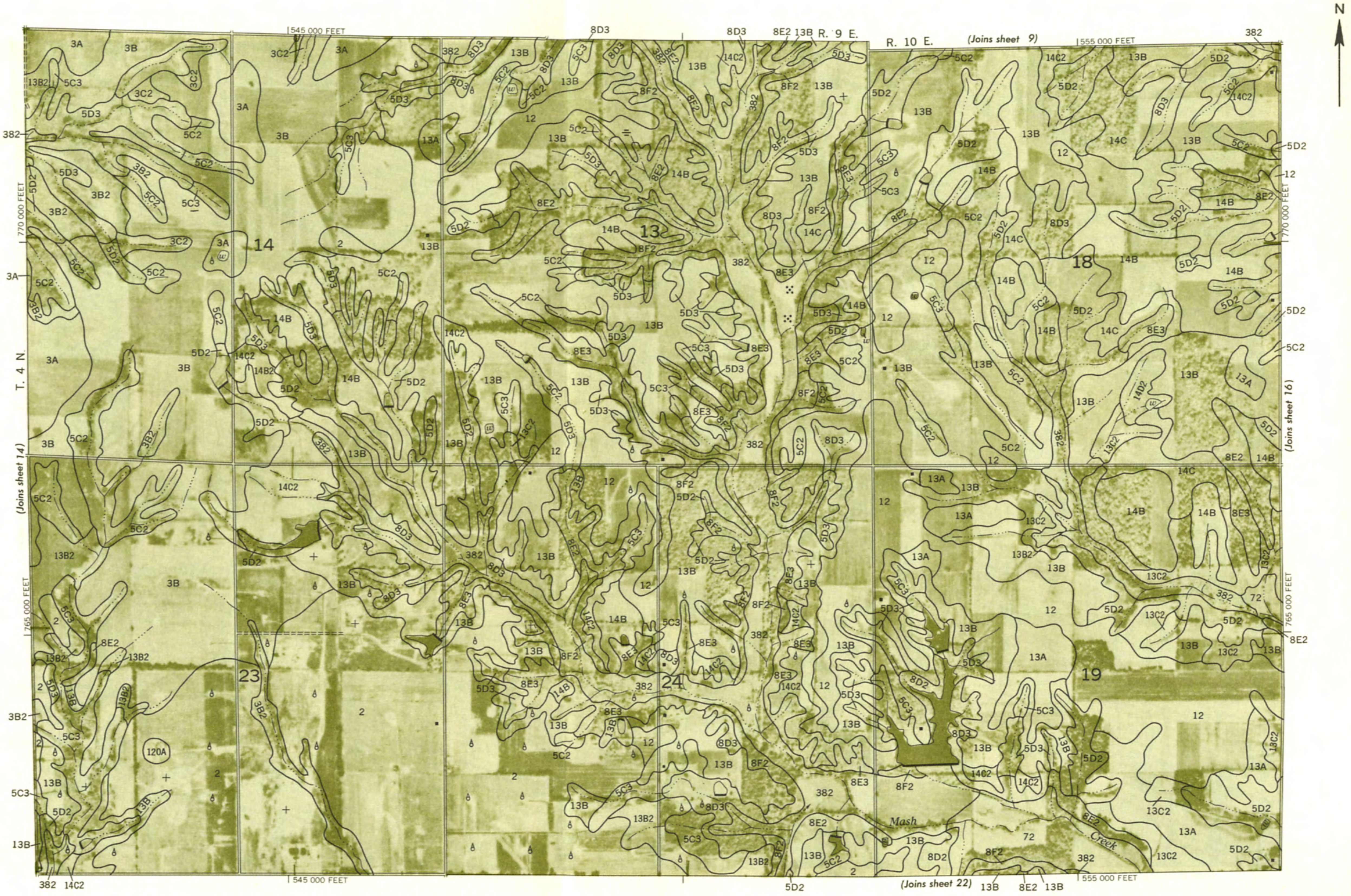

N
(Joins sheet 4)
560 000 FEET
R. 10 E.
570 000 FEET
780 000 FEET
T. 4 N.
775 000 FEET
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
Coon Cr
Fox River
Camp Branch
Long Branch
Jack Oak Creek
TROBRAUGH CEMETERY
CENTRAL ILLINOIS
130
5
4
3
8
9
10

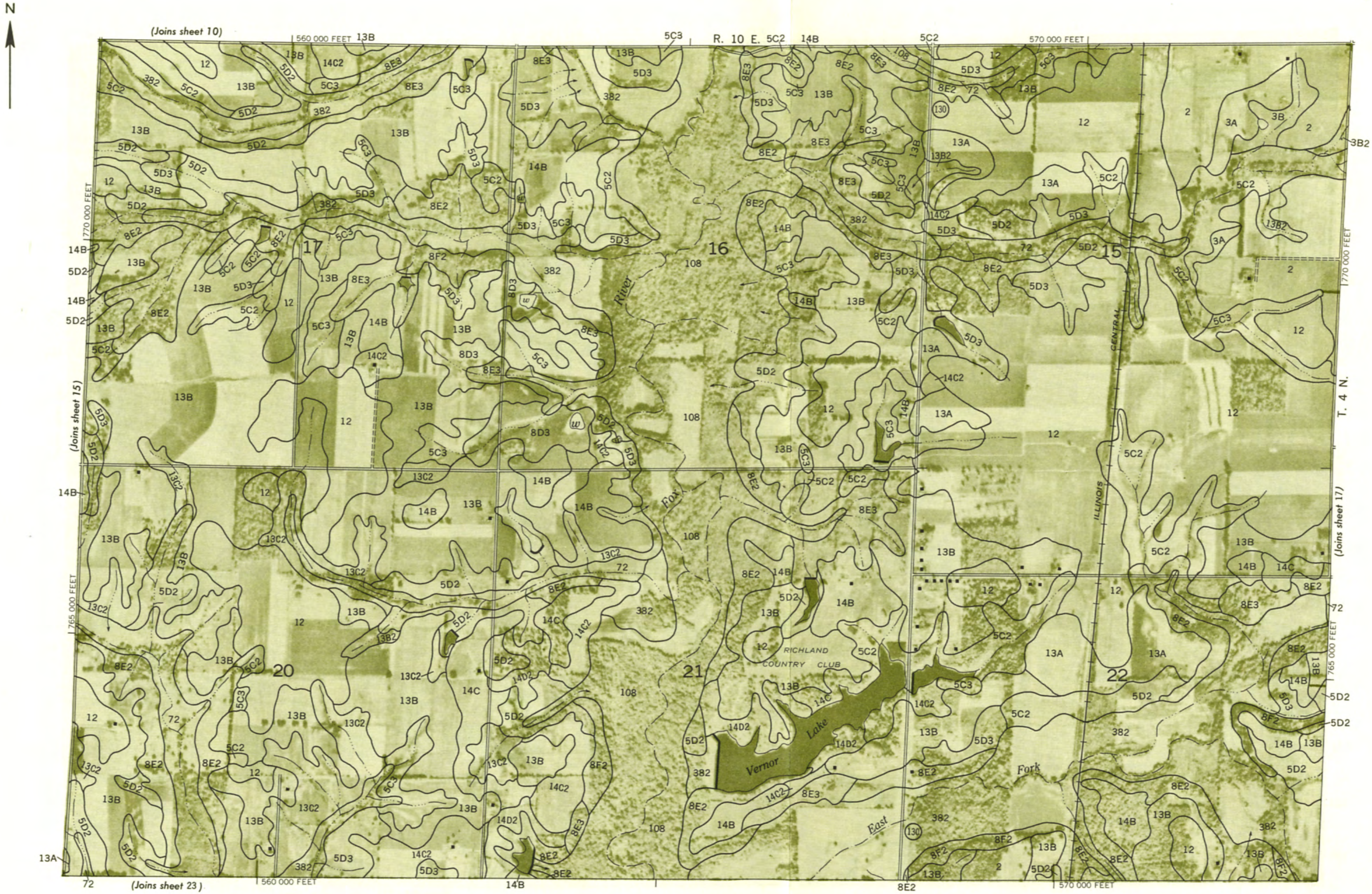

N
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
(Joins sheet 5)
780 000 FEET
775 000 FEET
T. 4 N.
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
Jack Oak Creek
Saron Church
1
2
6
7
11
12

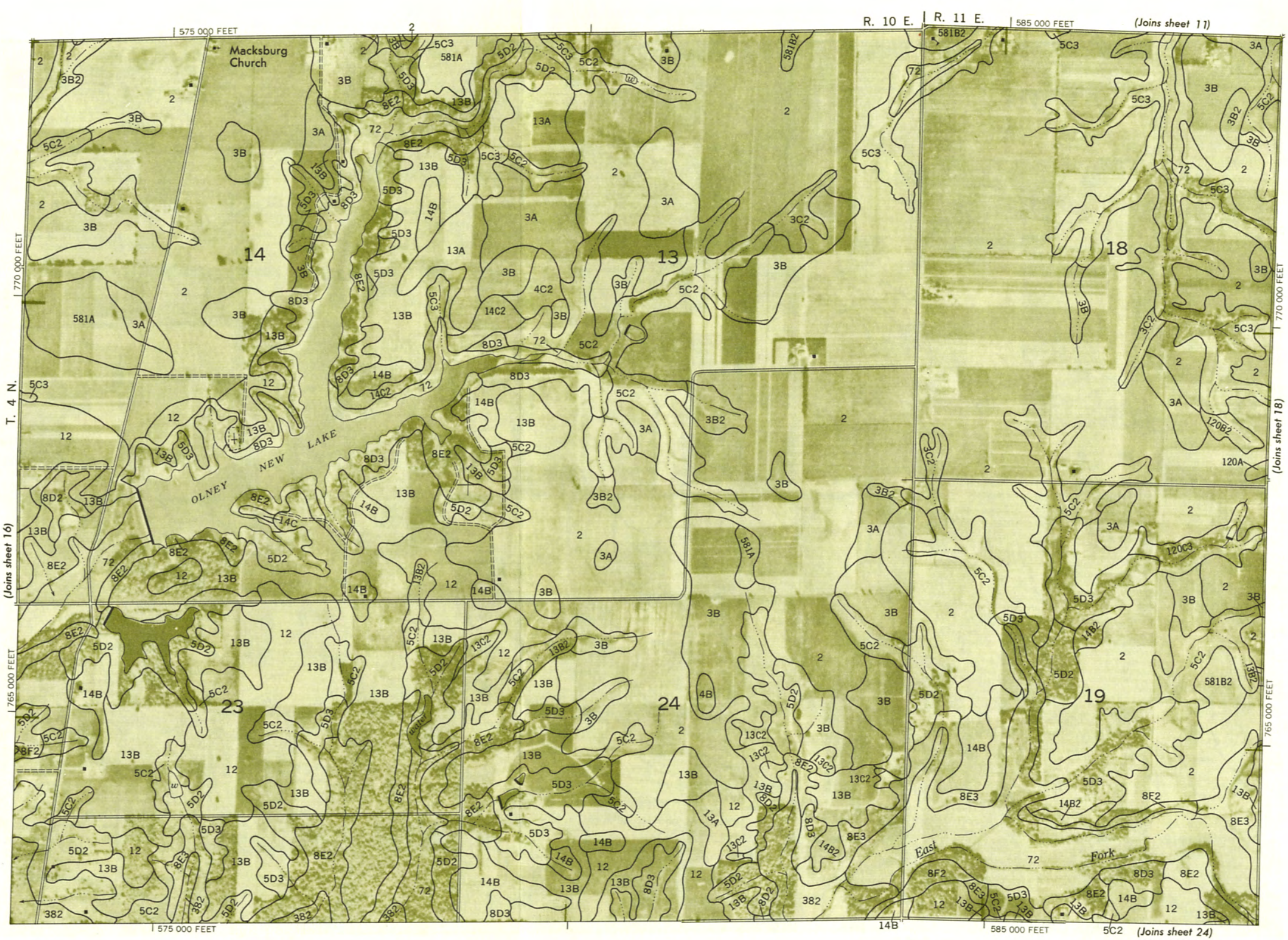

N
(Joins sheet 6)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 18)
R. 14 W.
T. 4 N.
590 000 FEET
600 000 FEET
780 000 FEET
775 000 FEET
Catfkiller
Creek
Murphy
St Joseph Church


N
R. 14 W.
(Joins sheet 7)
605 000 FEET
620 000 FEET
780 000 FEET
775 000 FEET
T. 4 N.
(Joins sheet 12)
LAWRENCE COUNTY
(Joins sheet 19)
Asbury Church
3
2
1
10
11
12

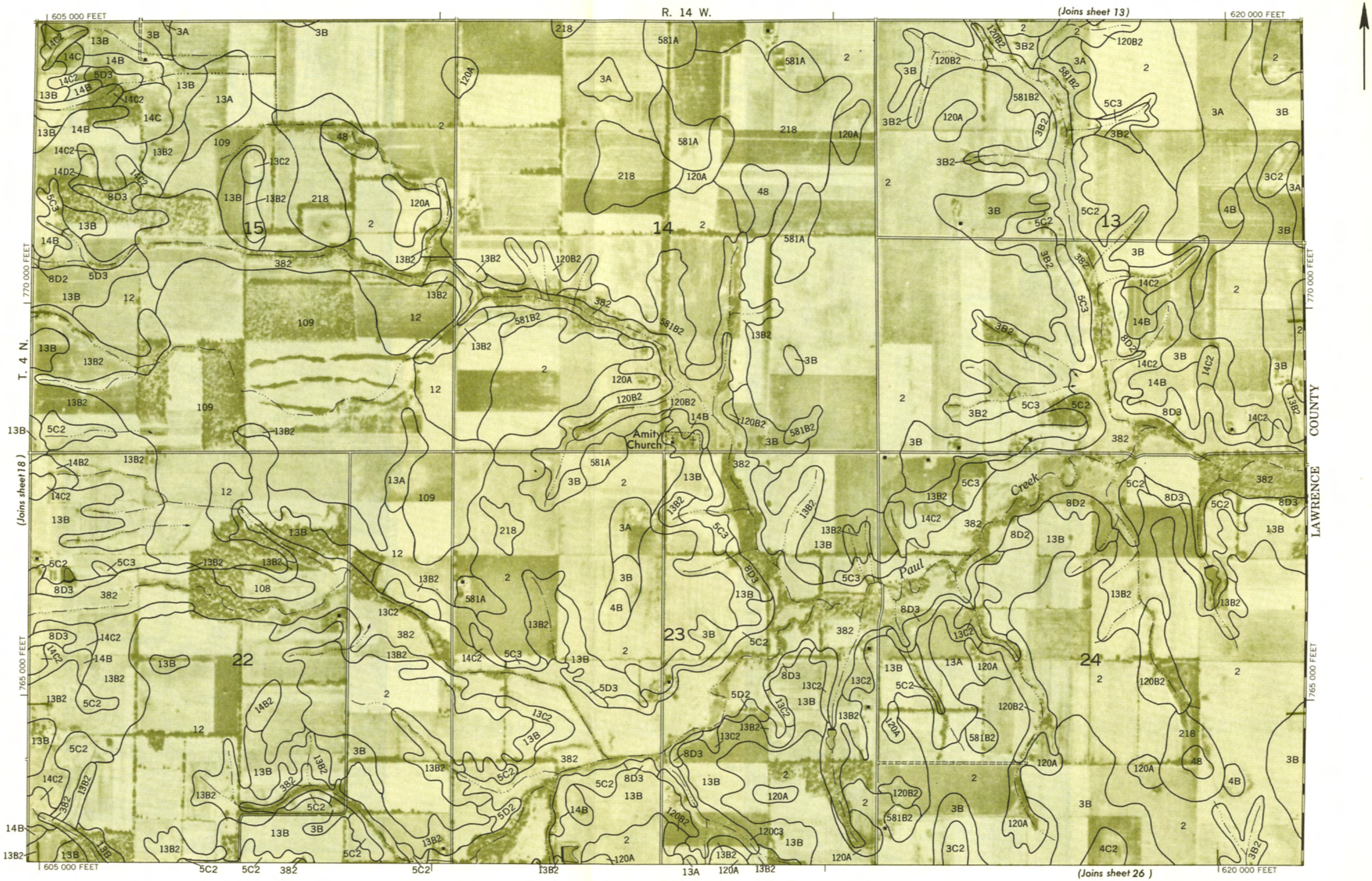

N
(Joins sheet 8)
530 000 FEET
R. 9 E.
540 000 FEET
Passport
Jesse
Creek
Sugar
Creek
Pleasant Valley
Church
770 000 FEET
765 000 FEET
(Joins inset, sheet 20)
(Joins sheet 15)
T. 4 N.
(Joins sheet 21)
15
16
17
20
21
22


N
R. 9 E.
R. 10 E.
T. 4 N.
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 22)
545 000 FEET
555 000 FEET
770 000 FEET
765 000 FEET
13
14
18
19
23
24
Mash
Creek


N
(Joins sheet 10)
560 000 FEET
R. 10 E.
570 000 FEET
770 000 FEET
765 000 FEET
(Joins sheet 15)
(Joins sheet 17)
T. 4 N.
(Joins sheet 23)
River
Fox
RICHLAND COUNTRY CLUB
Vernor Lake
East Fork
ILLINOIS CENTRAL
17
16
15
20
21
22

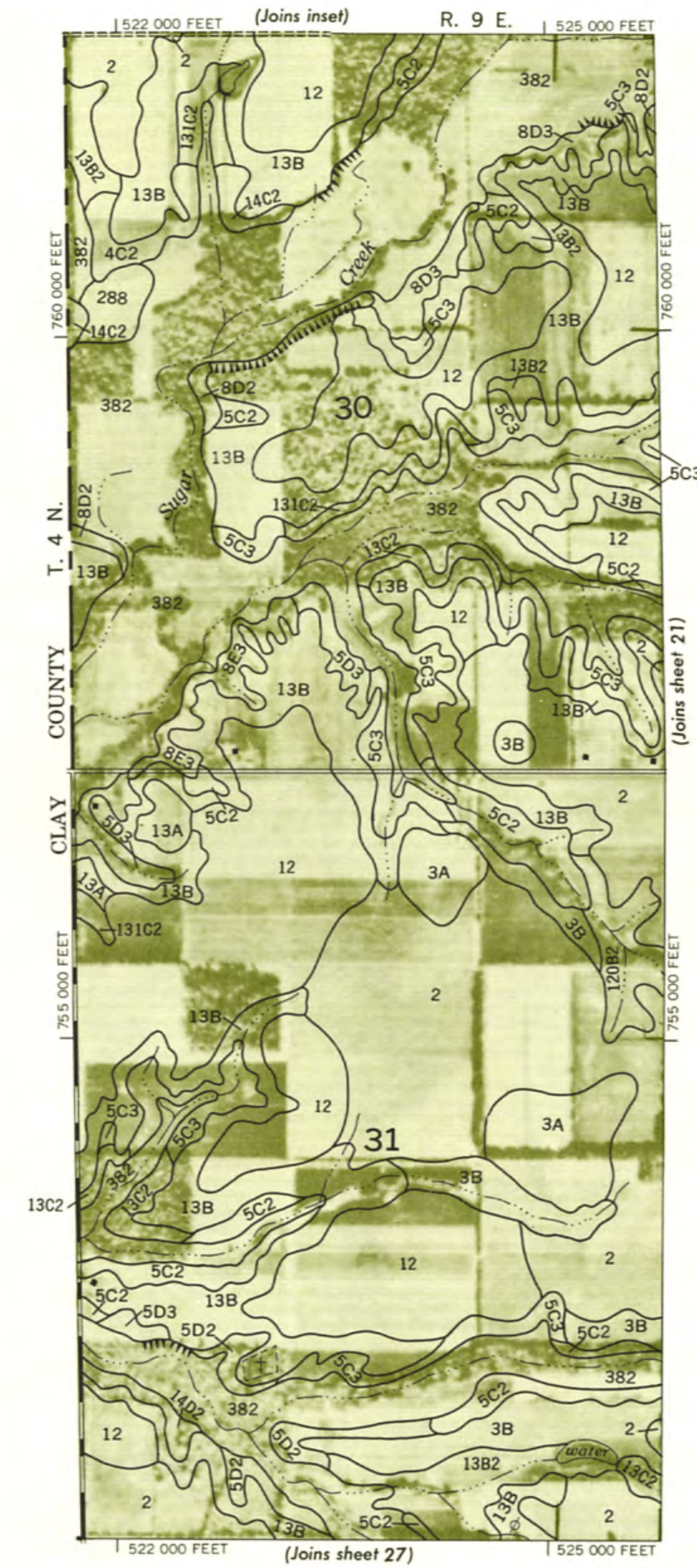

N
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
(Joins sheet 11)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 24)
770 000 FEET
765 000 FEET
T. 4 N.
Macksburg Church
OLNEY NEW LAKE
East Fork
14
13
18
23
24
19


N
(Joins sheet 12)
590 000 FEET
600 000 FEET
R. 14 W.
T. 4 N.
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 25)
770 000 FEET
765 000 FEET
18
17
16
19
20
21
East Fork


N
R. 14 W.
(Joins sheet 13)
605 000 FEET
620 000 FEET
770 000 FEET
765 000 FEET
T. 4 N.
(Joins sheet 18)
(Joins sheet 26)
LAWRENCE COUNTY
Amity Church
Paul Creek
15
14
13
22
23
24

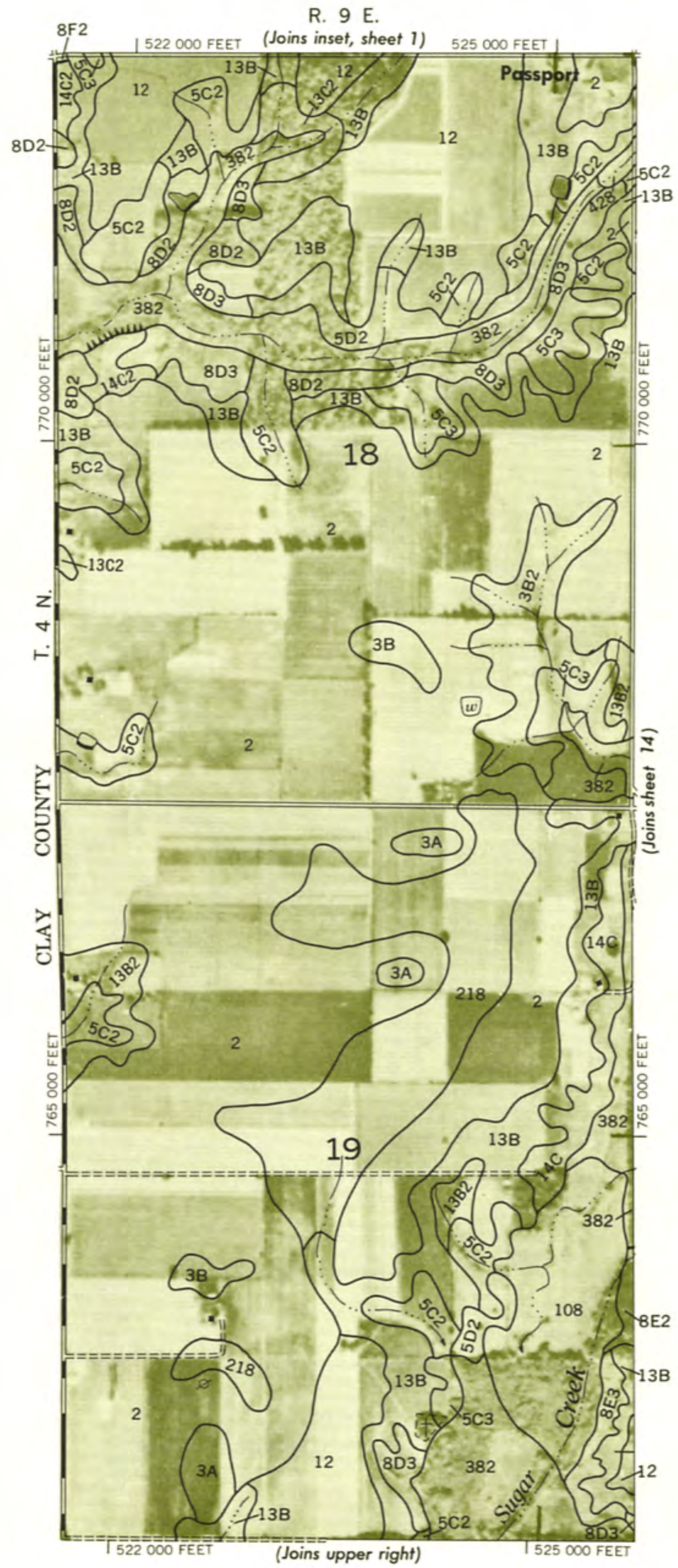
20

N



3000 AND 5000-FOOT GRID TICKS

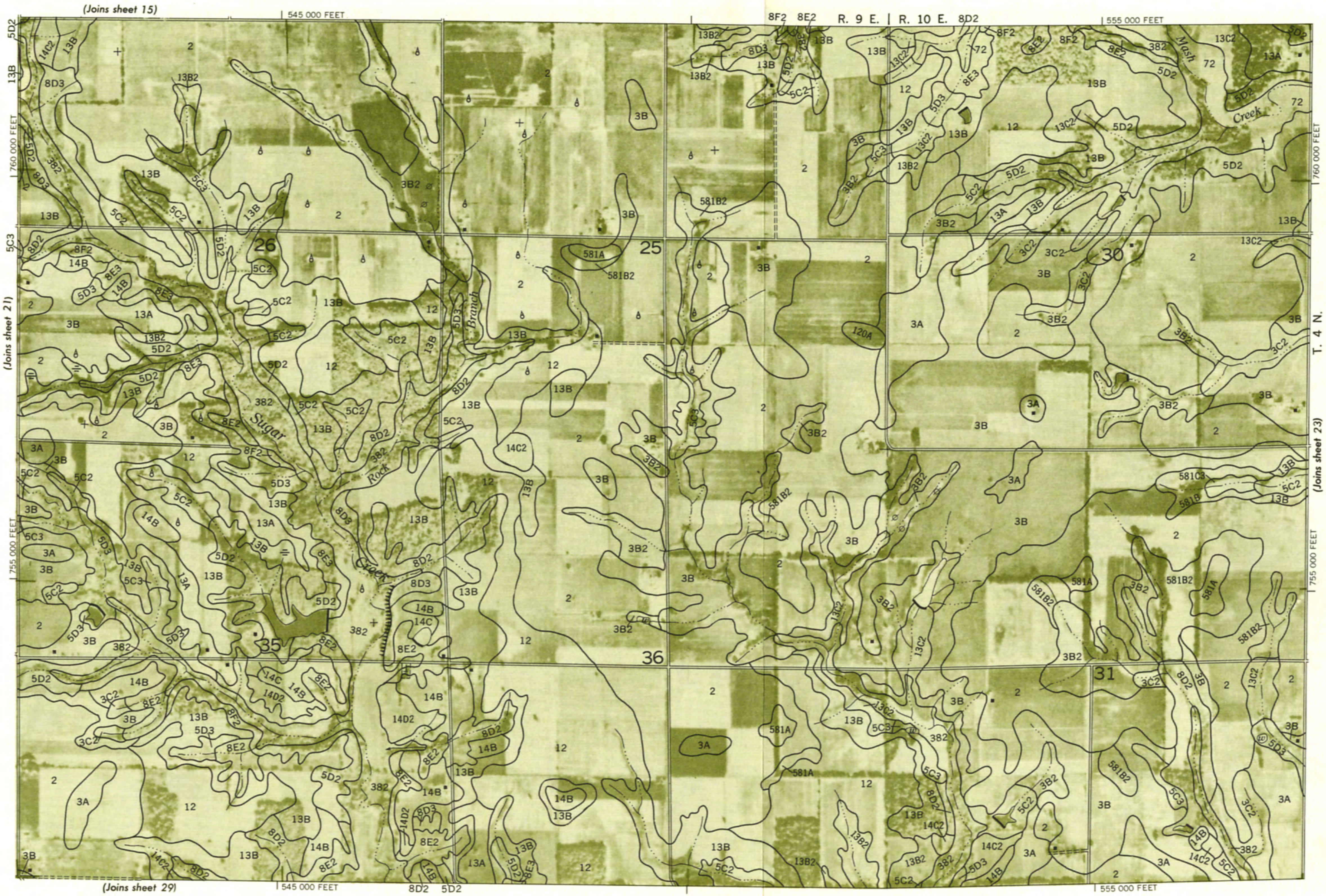
N

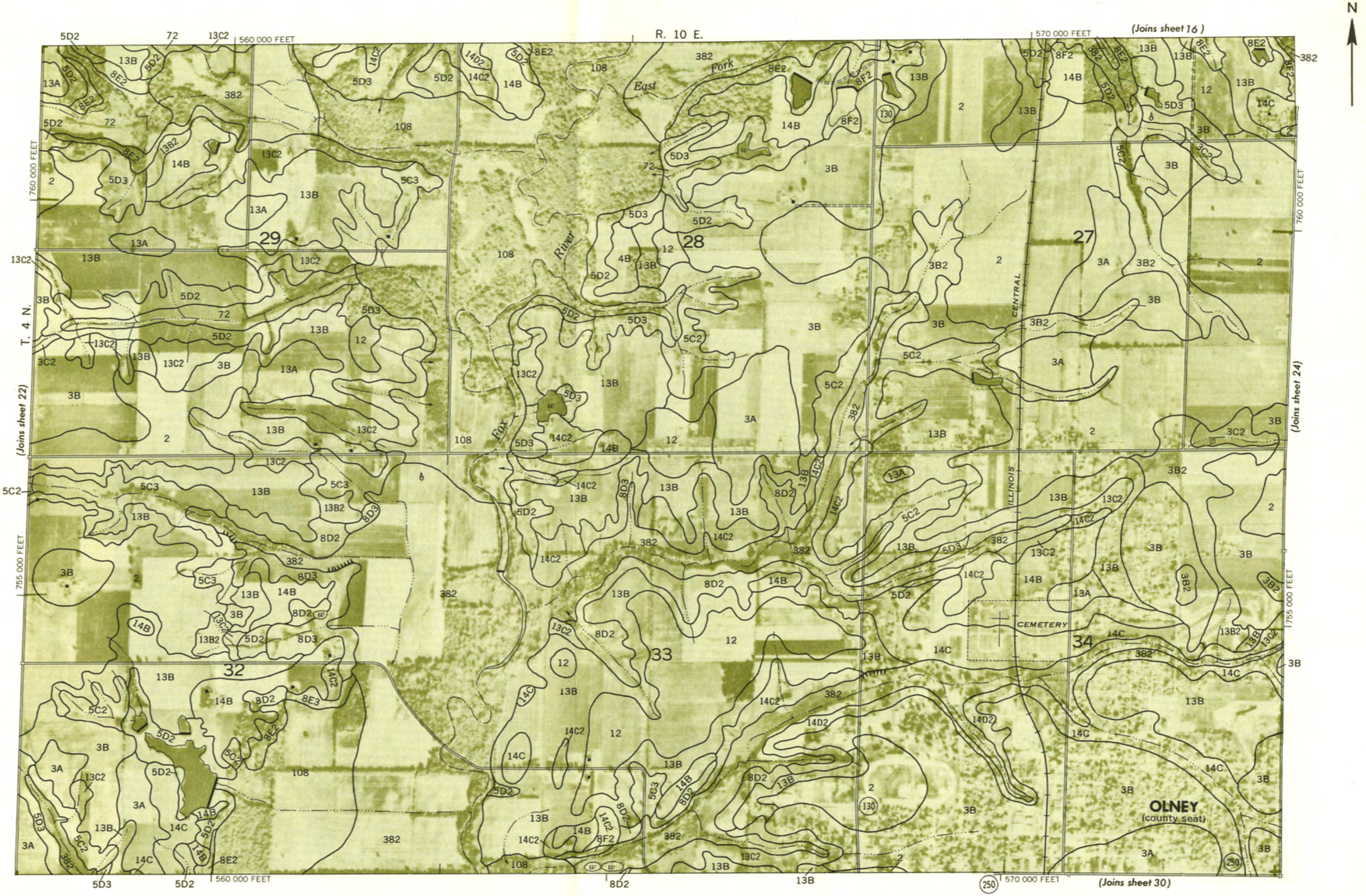


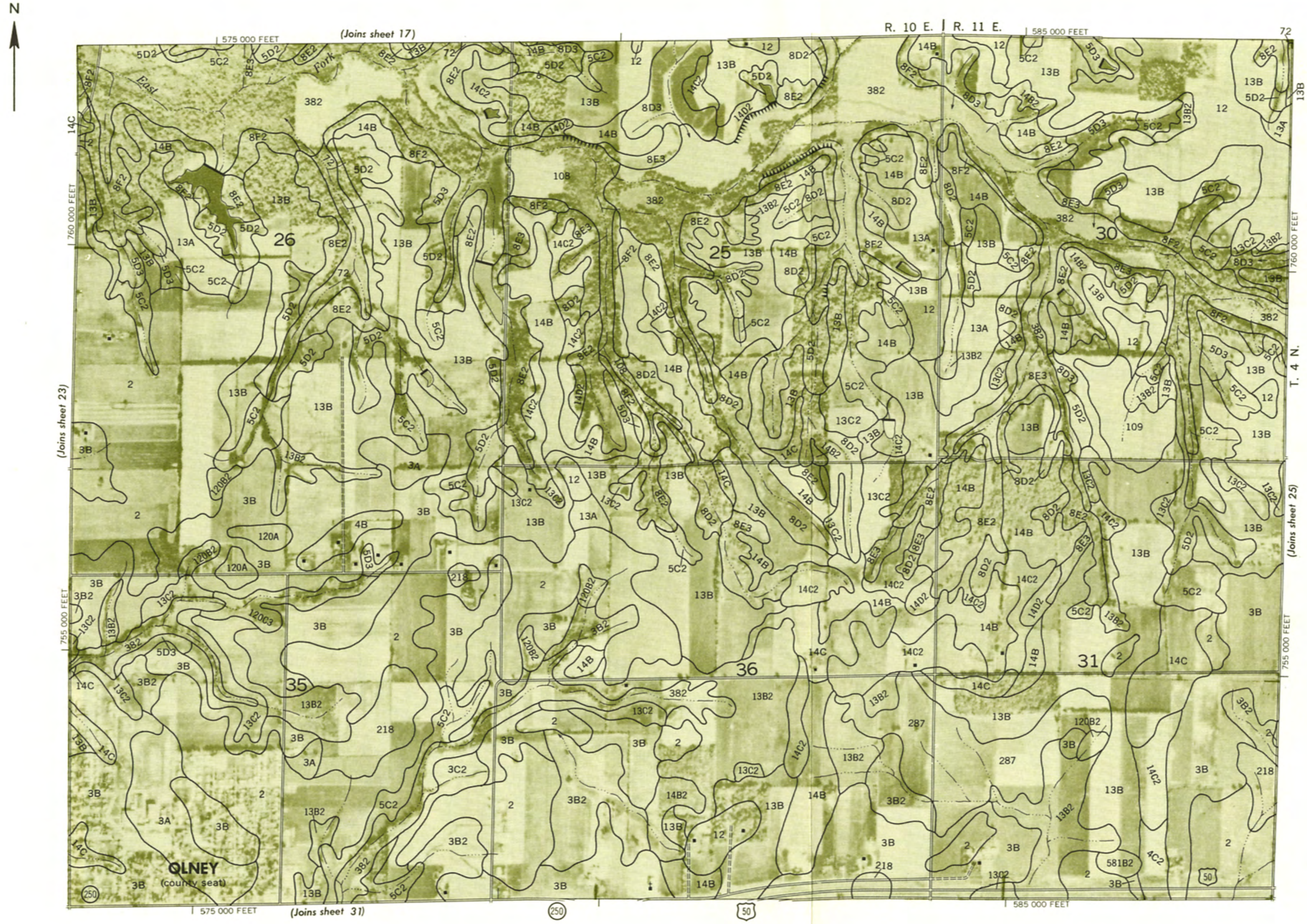
3000 AND 5000-FOOT GRID TICKS

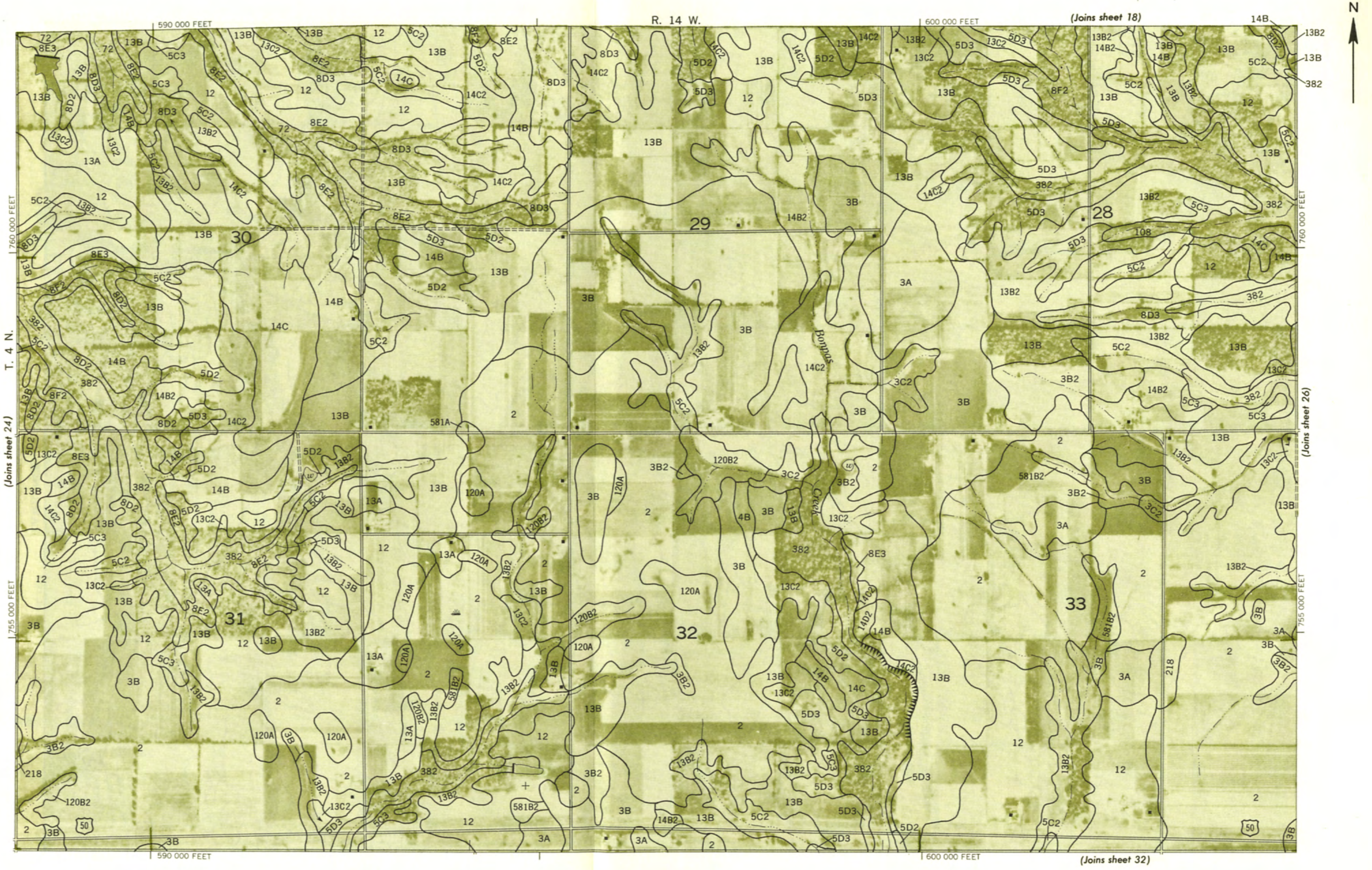

N
R. 9 E.
(Joins sheet 14)
530 000 FEET
540 000 FEET
T. 4 N.
760 000 FEET
755 000 FEET
(Joins sheet 20)
(Joins sheet 22)
29
28
27
32
33
34
OIL SUPPLY DEPOT
(27)
(Joins sheet 28)

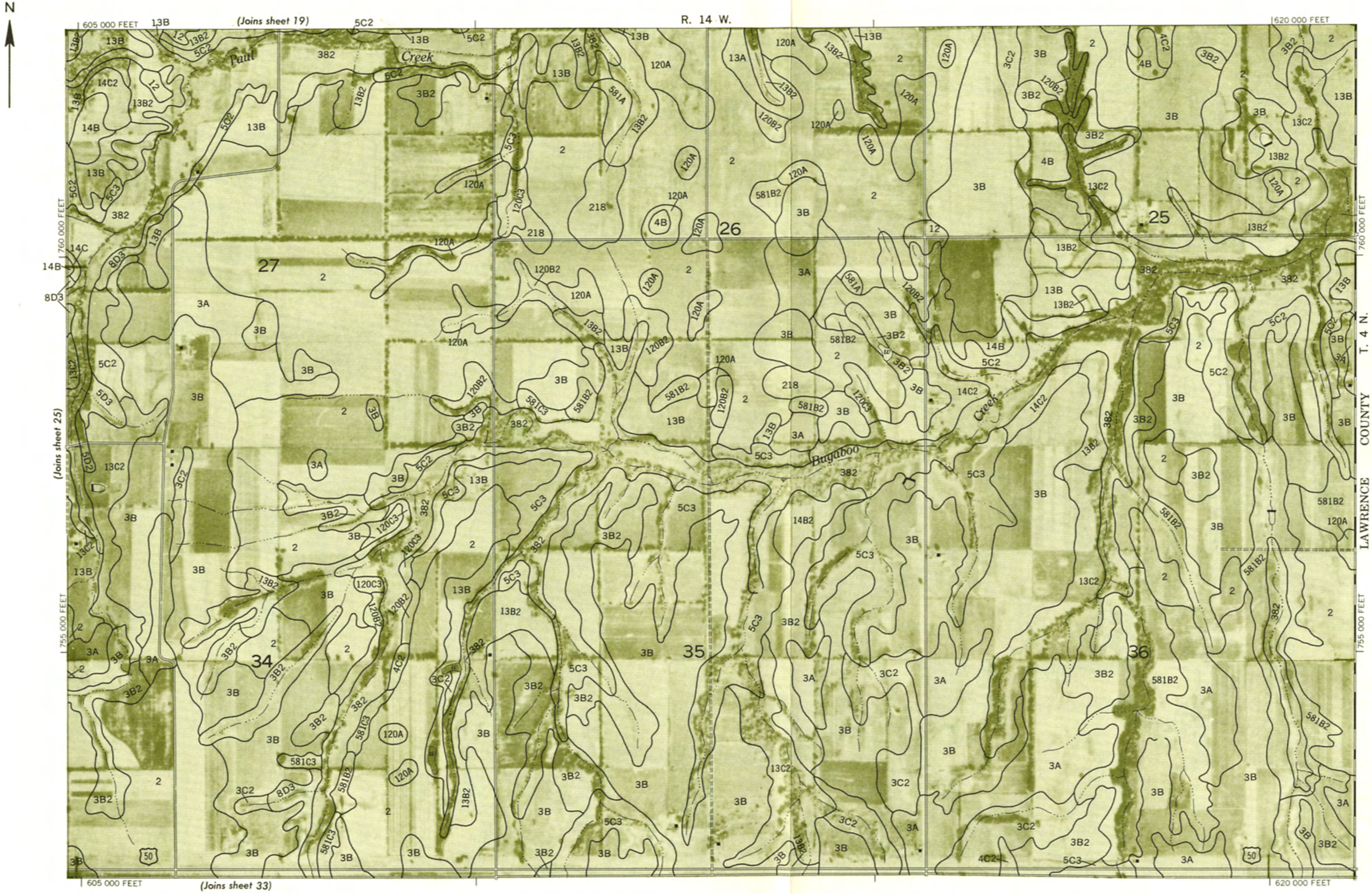
N

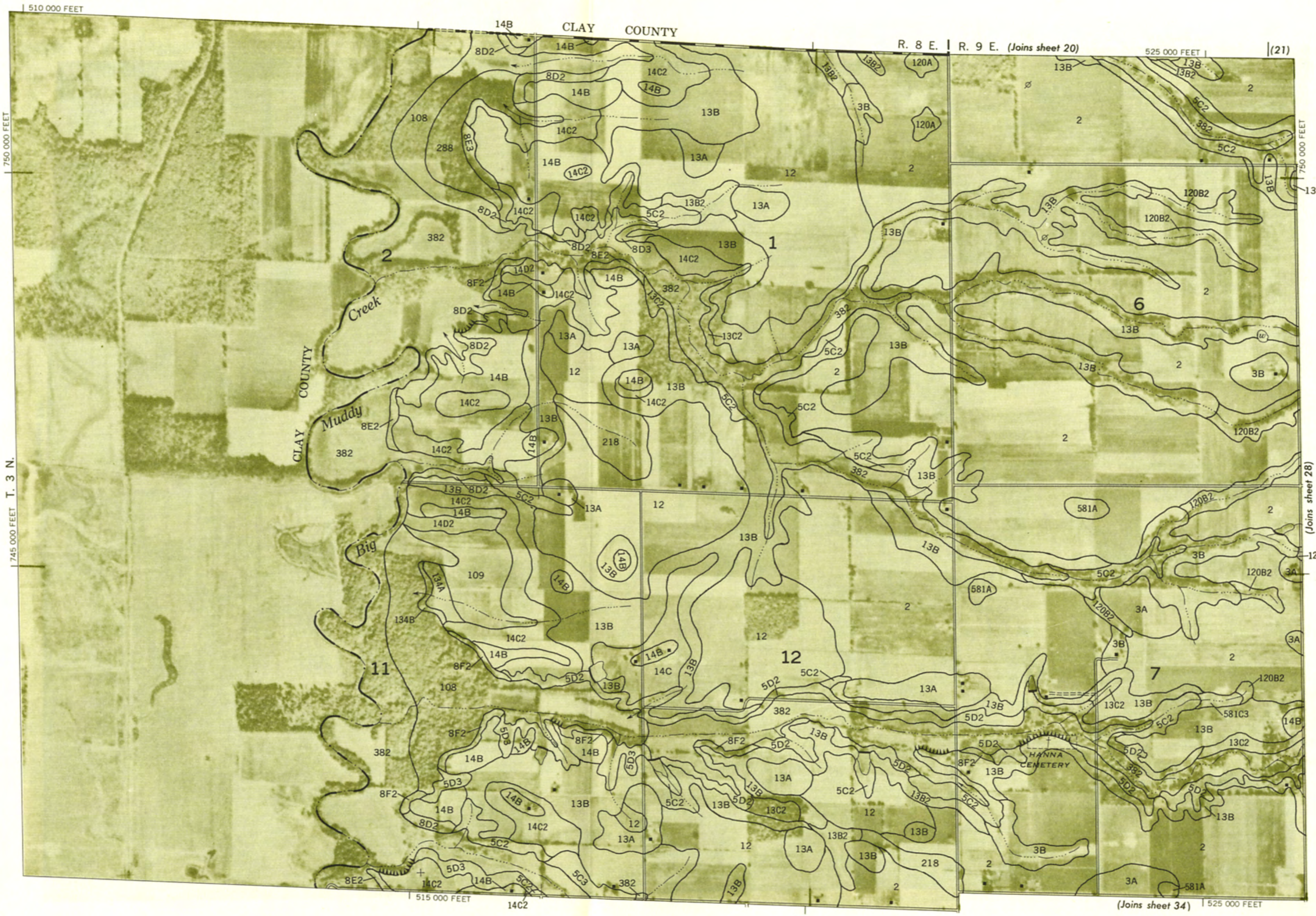

(Joins sheet 15)
545 000 FEET
R. 9 E. | R. 10 E.
555 000 FEET
760 000 FEET
755 000 FEET
(Joins sheet 21)
(Joins sheet 23)
T. 4 N.
(Joins sheet 29)
26
25
30
35
36
31
Sugar
Rock
Creek
Branch
Mash
Creek

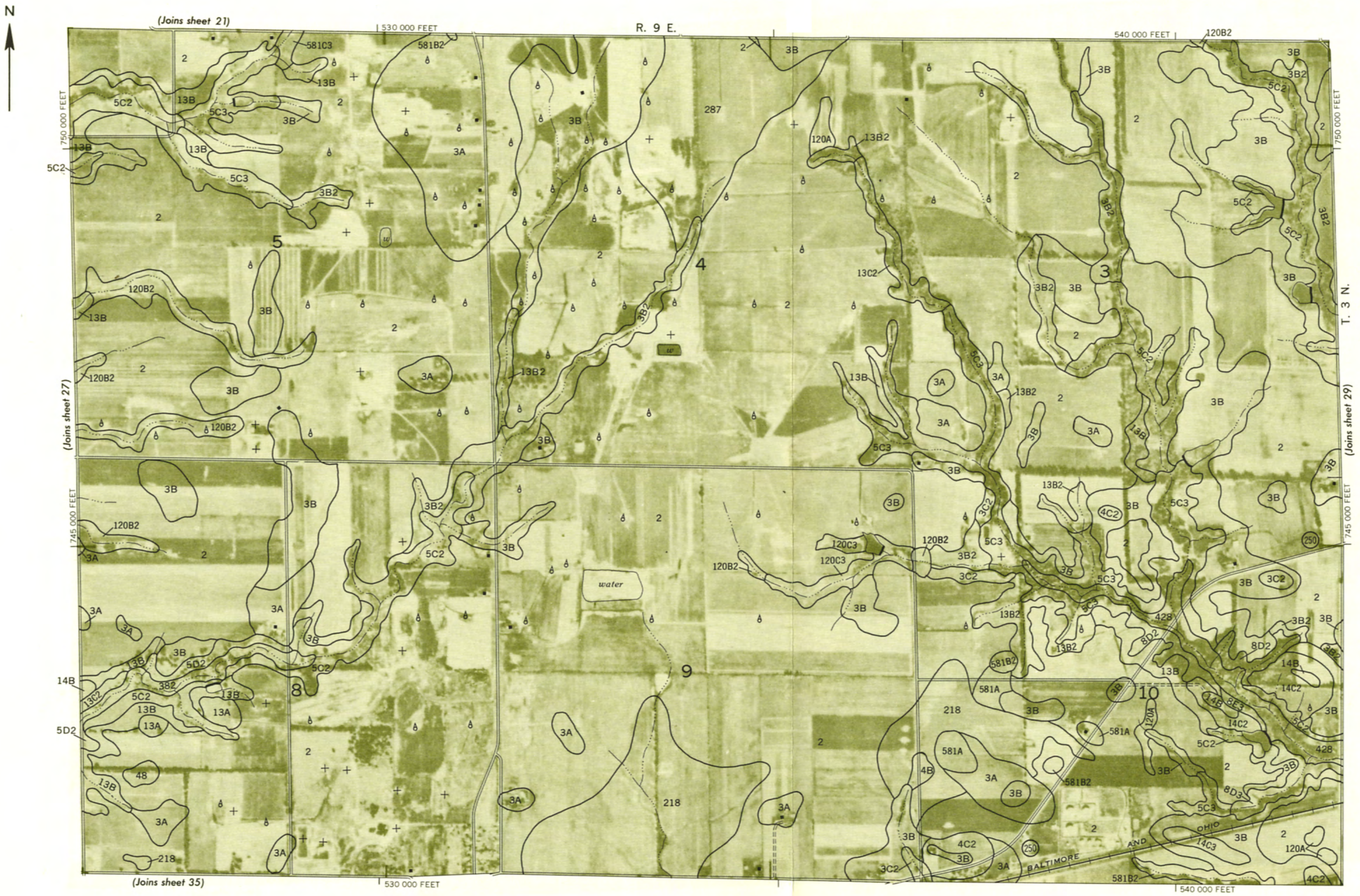

N
R. 10 E.
T. 4 N.
560 000 FEET
570 000 FEET
760 000 FEET
755 000 FEET
(Joins sheet 16)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 30)
East Fork
Fox River
CENTRAL
ILLINOIS
CEMETERY
OLNEY
(county seat)
27
28
29
32
33
34
130
250

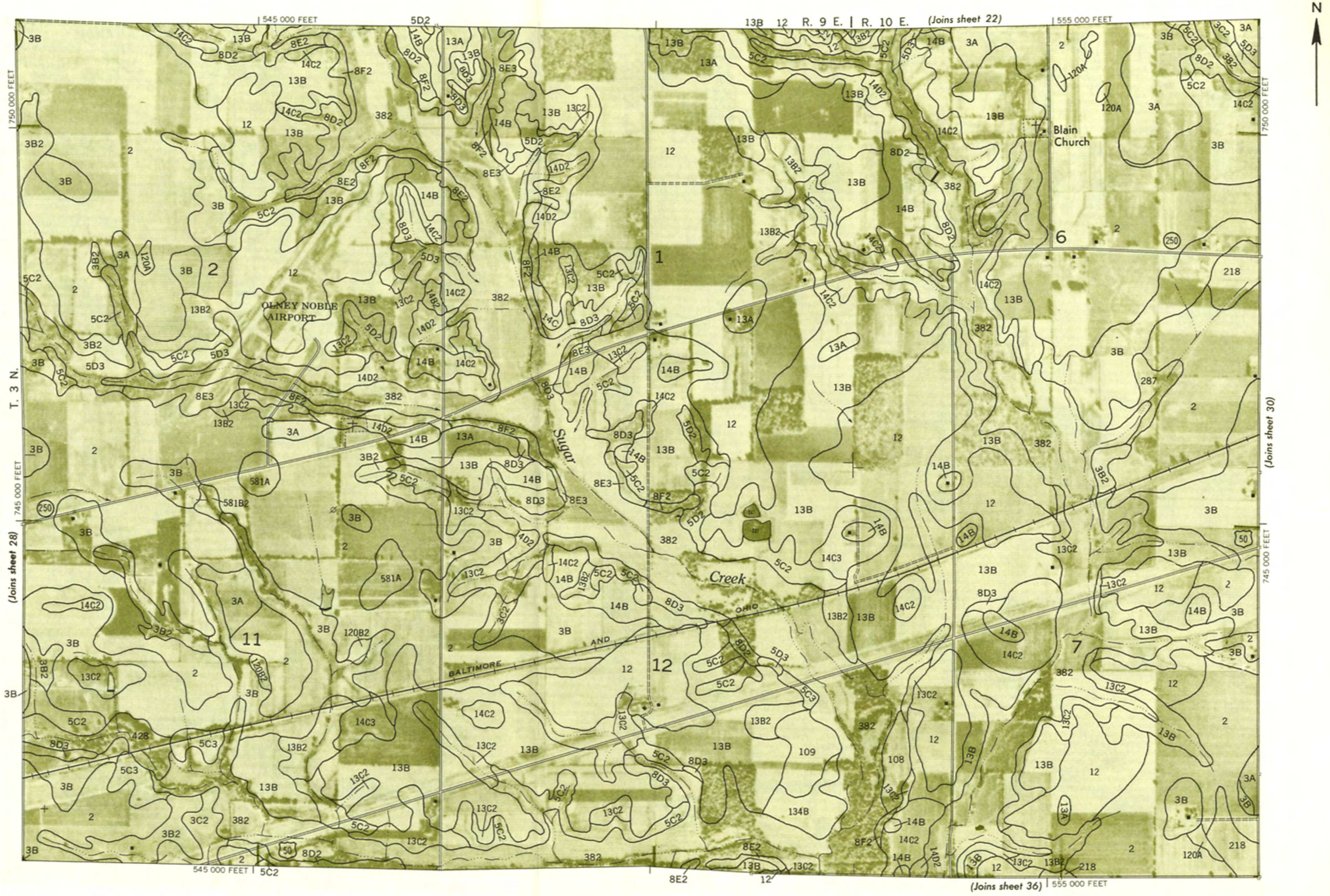

N
(Joins sheet 17)
575 000 FEET
R. 10 E.
R. 11 E.
585 000 FEET
760 000 FEET
755 000 FEET
T. 4 N.
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 31)
East Fork
26
25
30
35
36
31
OLNEY
(county seat)
250
50


N
R. 14 W.
T. 4 N.
(Joins sheet 18)
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 32)
590 000 FEET
600 000 FEET
760 000 FEET
755 000 FEET
28
29
30
31
32
33
Bonpas
Creek
50

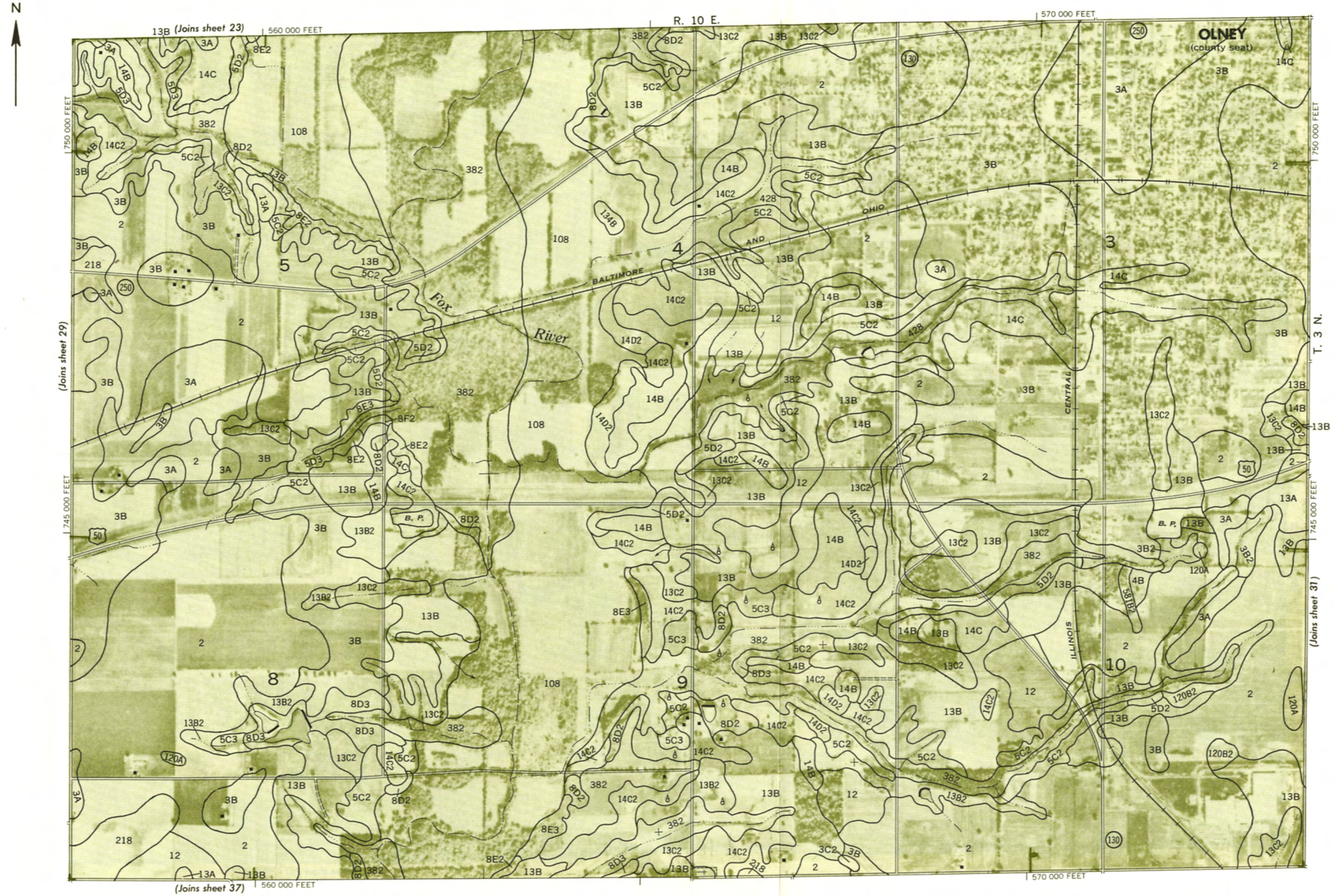

N
605 000 FEET
(Joins sheet 19)
R. 14 W.
620 000 FEET
760 000 FEET
755 000 FEET
(Joins sheet 25)
T. 4 N.
LAWRENCE COUNTY
(Joins sheet 33)
Paul Creek
Bugaboo Creek
25
26
27
34
35
36
50


510 000 FEET
CLAY COUNTY
R. 8 E.
R. 9 E. (Joins sheet 20)
525 000 FEET
(21)
N
750 000 FEET
745 000 FEET
T. 3 N.
(Joins sheet 28)
Big Muddy Creek
CLAY COUNTY
HANNA CEMETERY
515 000 FEET
(Joins sheet 34)
525 000 FEET
1
2
6
7
11
12


N
(Joins sheet 21)
530 000 FEET
R. 9 E.
540 000 FEET
750 000 FEET
745 000 FEET
(Joins sheet 27)
(Joins sheet 29)
T. 3 N.
(Joins sheet 35)
5
4
3
8
9
10
water
BALTIMORE AND OHIO


N
545 000 FEET
R. 9 E.
R. 10 E.
(Joins sheet 22)
555 000 FEET
750 000 FEET
745 000 FEET
T. 3 N.
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 36)
OLNEY NOBLE AIRPORT
Blain Church
Sugar
Creek
OHIO
AND
BALTIMORE
250
50

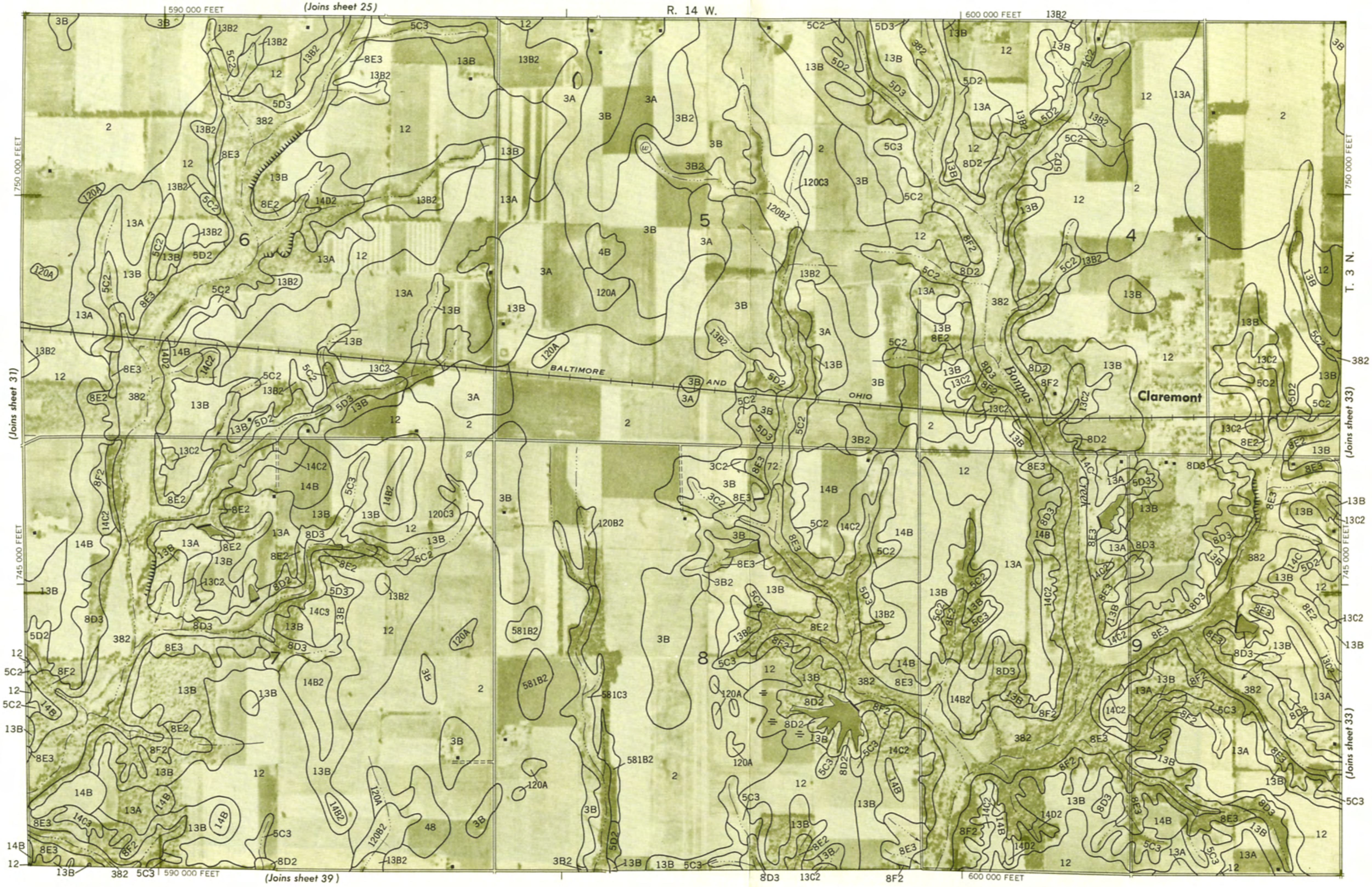
30

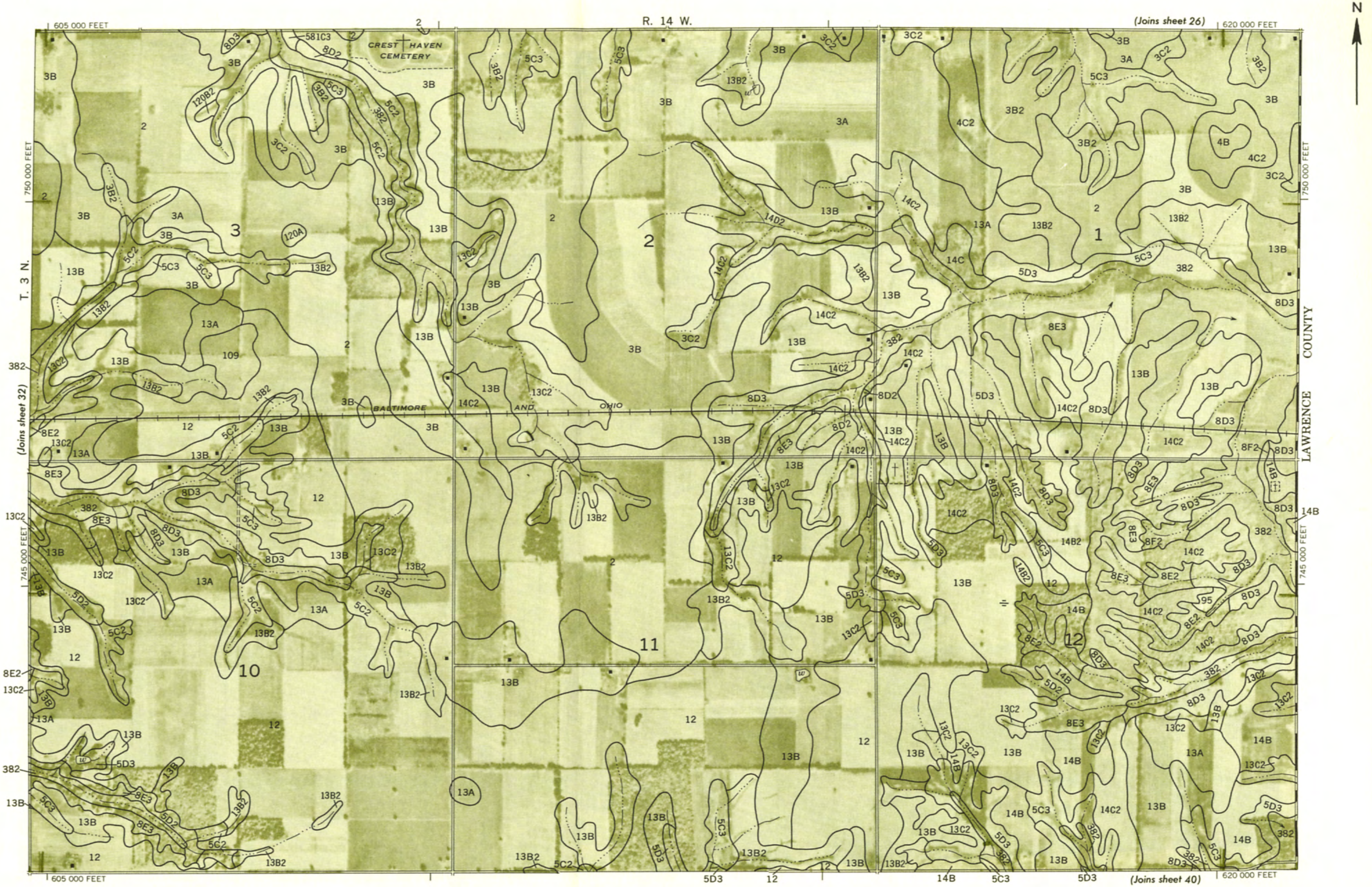

N
R. 10 E.
T. 3 N.
13B (Joins sheet 23)
560 000 FEET
570 000 FEET
750 000 FEET
745 000 FEET
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 37)
OLNEY
(county seat)
Fox
River
BALTIMORE
AND
OHIO
CENTRAL
ILLINOIS
B. P.
250
130
50
120A
5
4
3
8
9
10

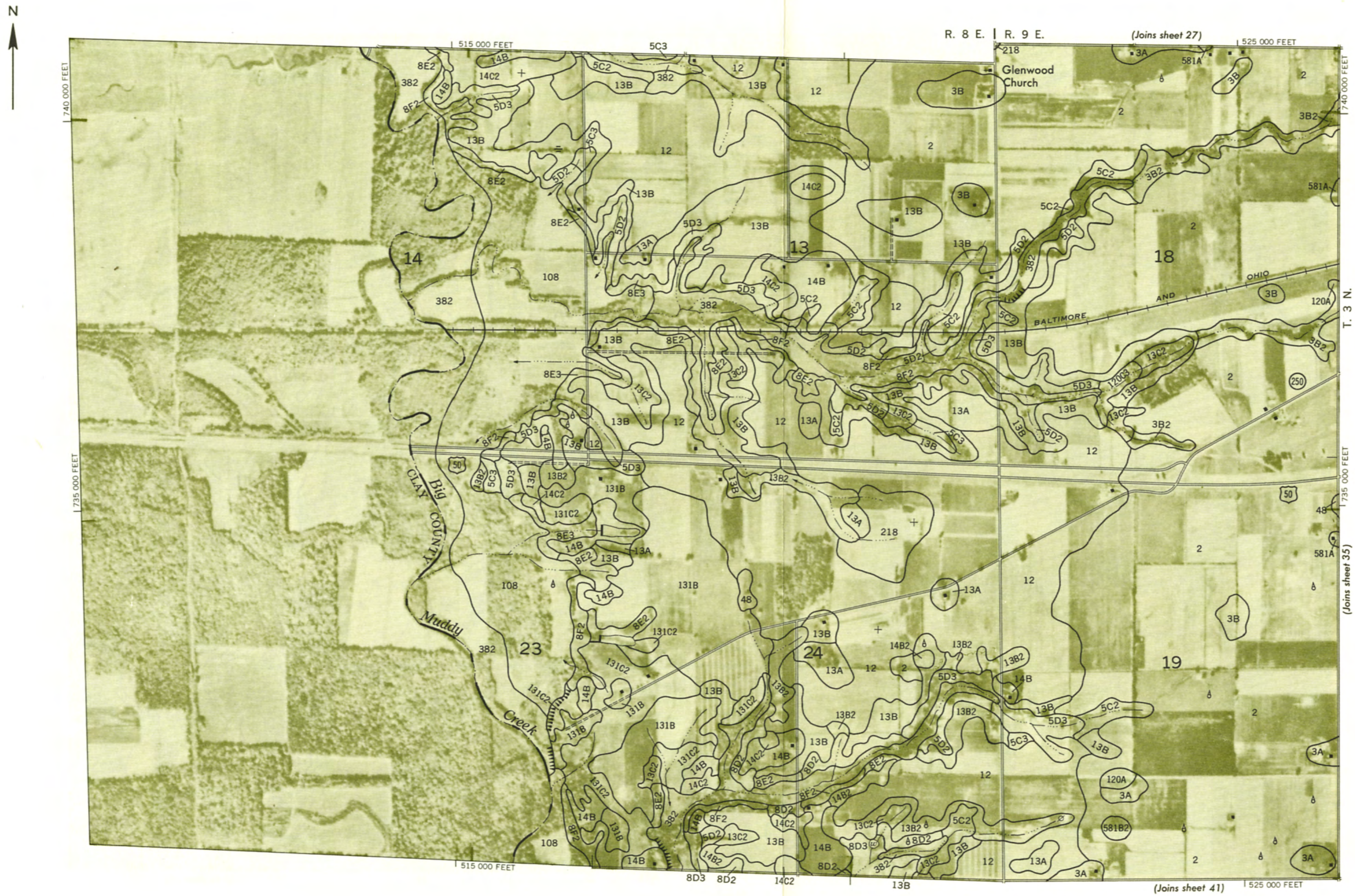

(Joins sheet 24)
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
750 000 FEET
745 000 FEET
N
OLNEY
(county seat)
T. 3 N.
BALTIMORE AND OHIO
BORROW PIT
B. P.
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 38)

32

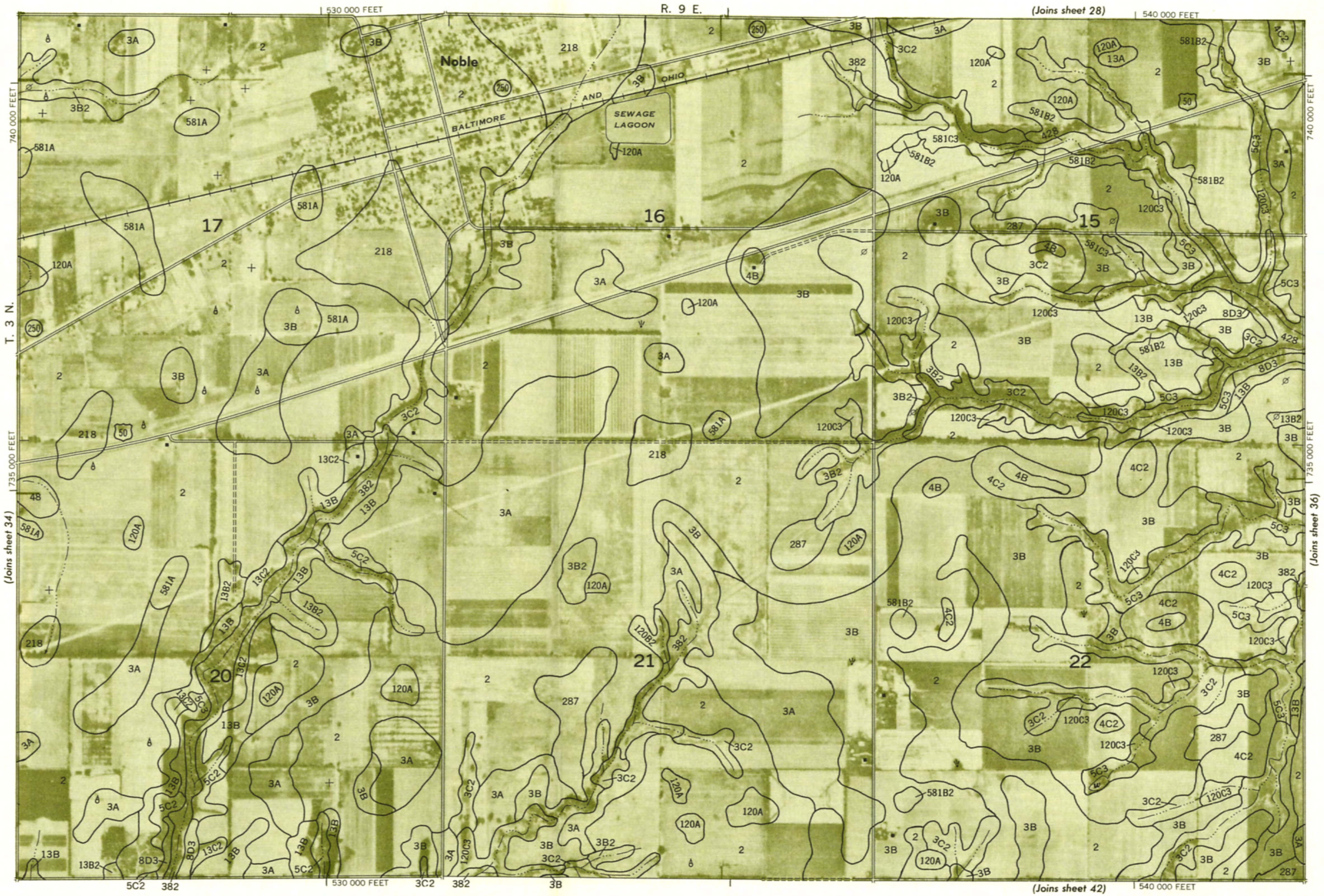
N

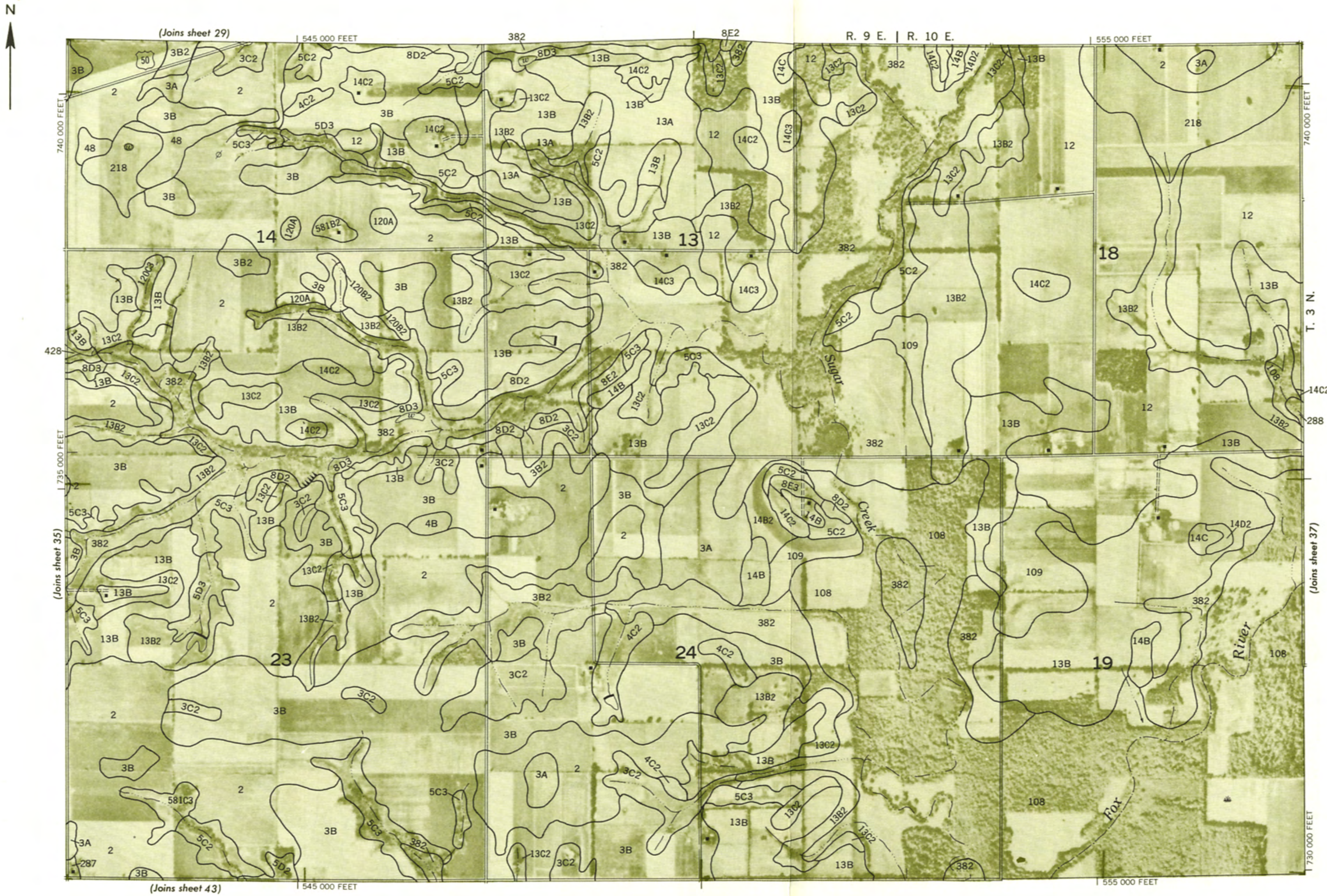

(Joins sheet 25)
590 000 FEET
R. 14 W.
600 000 FEET
750 000 FEET
745 000 FEET
T. 3 N.
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 33)
(Joins sheet 39)
BALTIMORE AND OHIO
Bonpas Creek
Claremont
6
5
4
7
8
9


N
605 000 FEET
R. 14 W.
(Joins sheet 26)
620 000 FEET
750 000 FEET
T. 3 N.
(Joins sheet 32)
745 000 FEET
LAWRENCE COUNTY
(Joins sheet 40)
CREST HAVEN CEMETERY
BALTIMORE AND OHIO
1
2
3
10
11
12

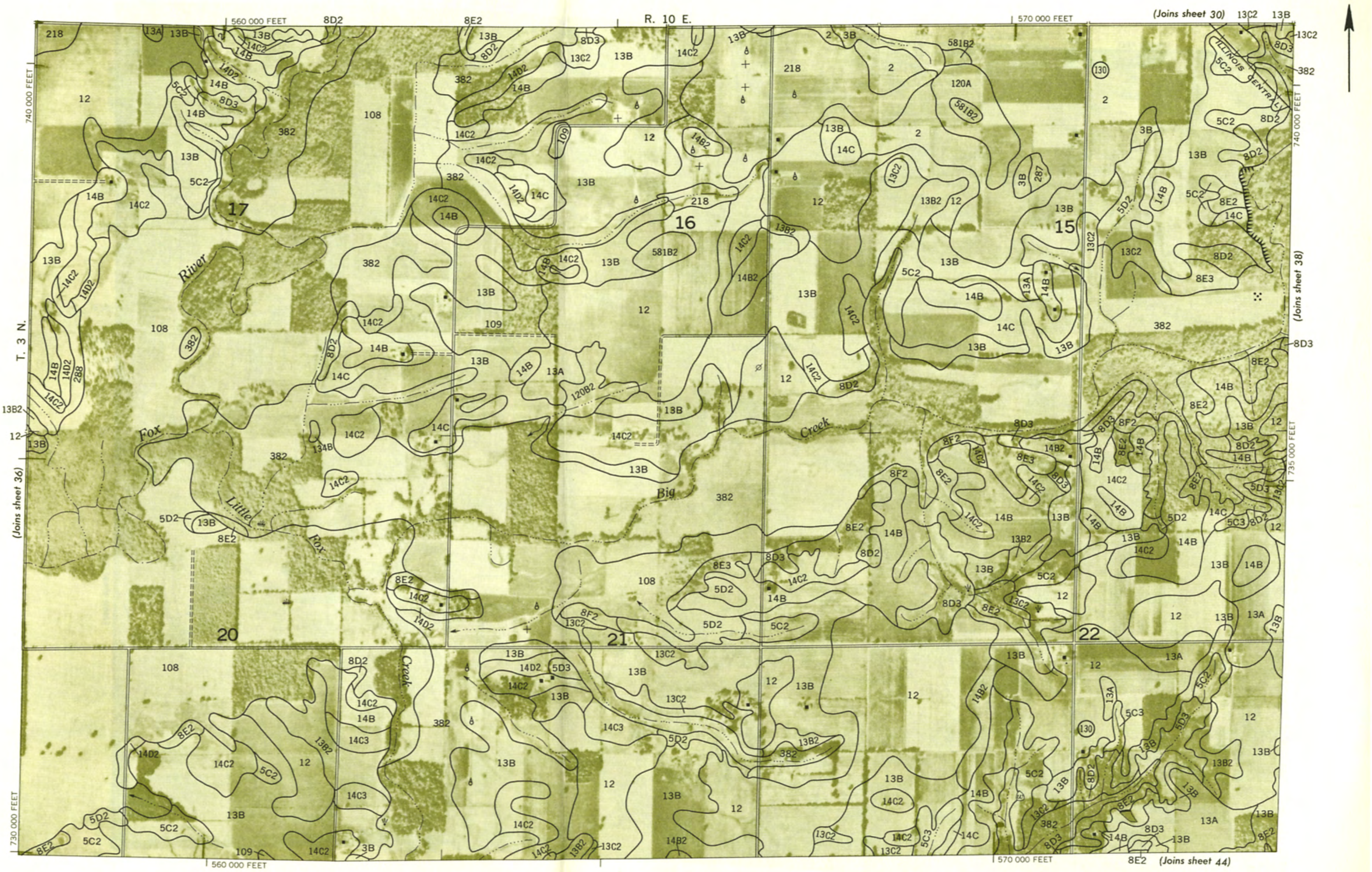

N
R. 8 E.
R. 9 E.
(Joins sheet 27)
515 000 FEET
525 000 FEET
740 000 FEET
735 000 FEET
Glenwood Church
14
13
18
23
24
19
BALTIMORE AND OHIO
T. 3 N.
CLAY COUNTY
Big Muddy Creek
50
250
(Joins sheet 35)
(Joins sheet 41)

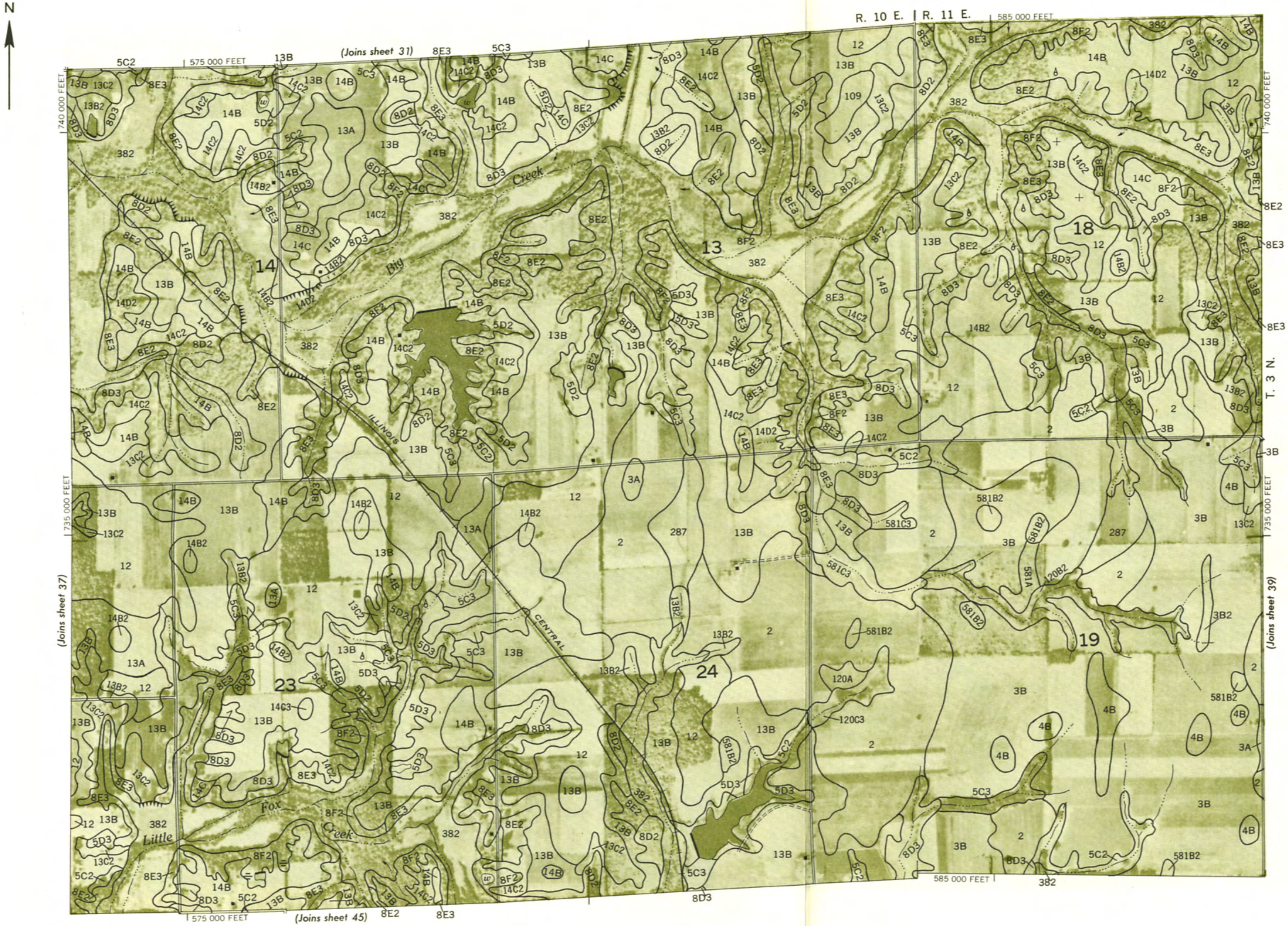
N

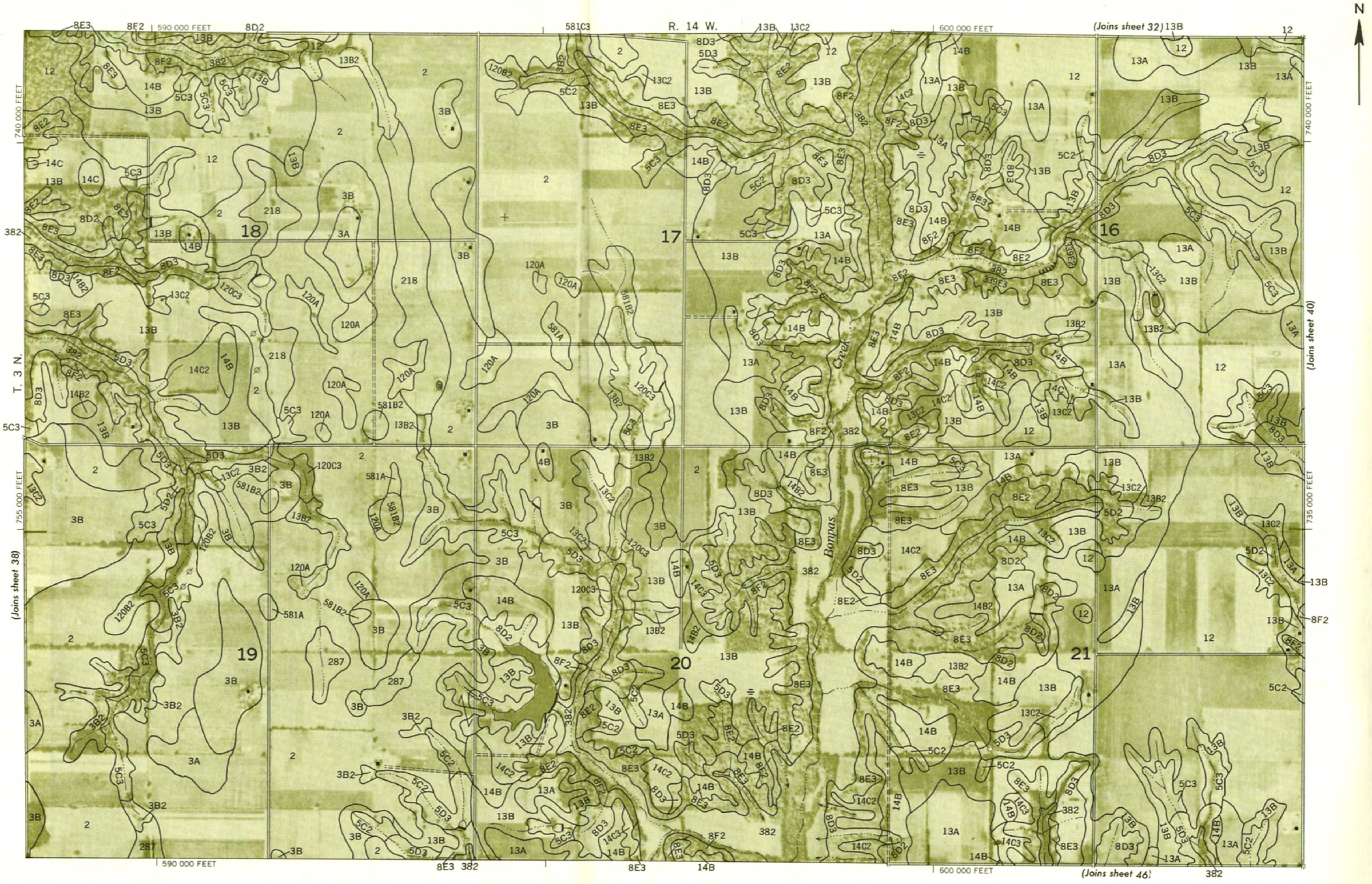

(Joins sheet 28)
R. 9 E.
530 000 FEET
540 000 FEET
740 000 FEET
735 000 FEET
T. 3 N.
Noble
BALTIMORE AND OHIO
SEWAGE LAGOON
17
16
15
20
21
22
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 42)

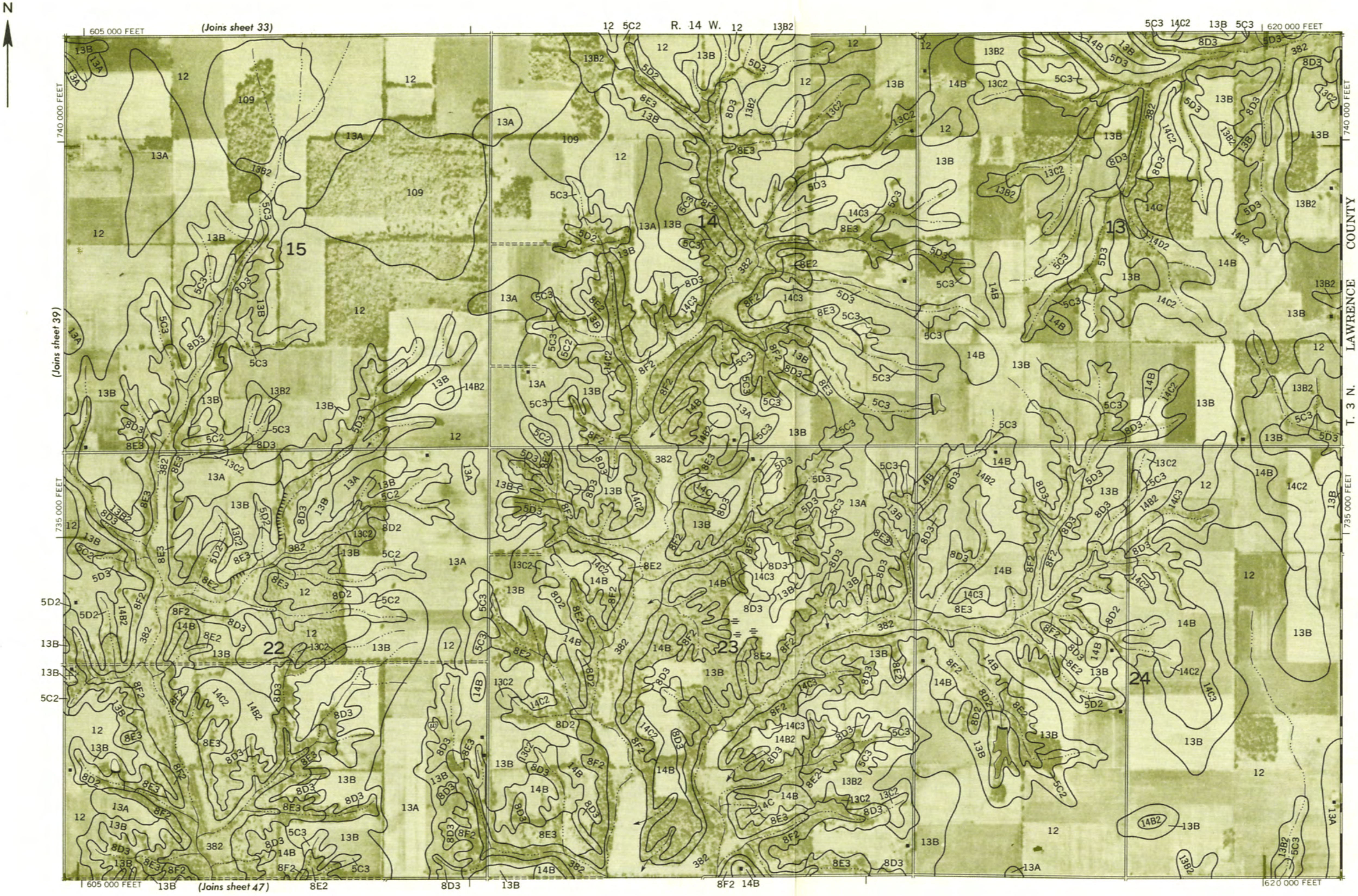

N
(Joins sheet 29)
545 000 FEET
R. 9 E. | R. 10 E.
555 000 FEET
740 000 FEET
735 000 FEET
730 000 FEET
T. 3 N.
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 43)
14
13
18
23
24
19
50
Sugar
Creek
Fox
River

37

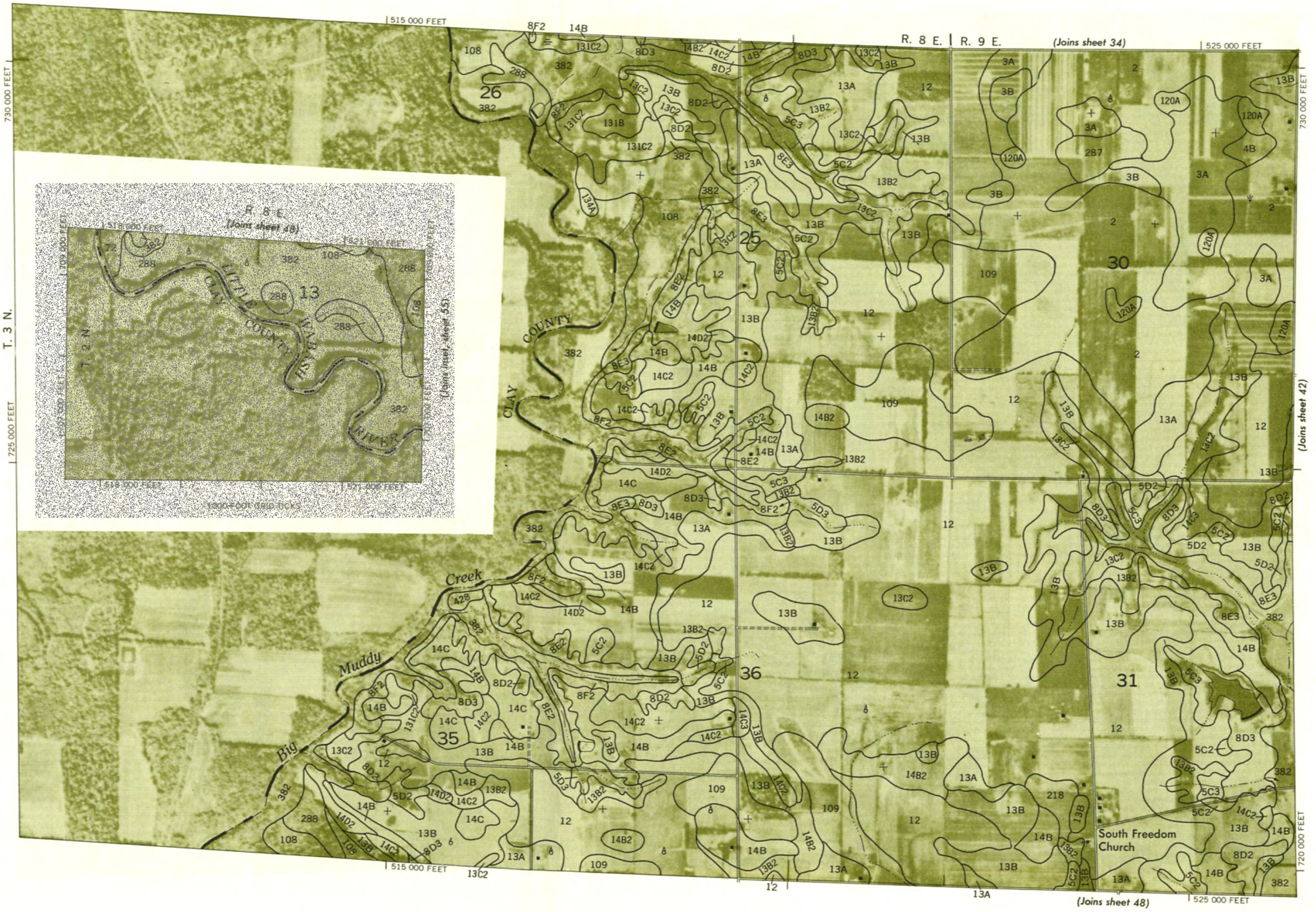

N
(Joins sheet 30)
(Joins sheet 38)
(Joins sheet 36)
(Joins sheet 44)
560 000 FEET
570 000 FEET
740 000 FEET
735 000 FEET
730 000 FEET
R. 10 E.
T. 3 N.
17
16
15
20
21
22
Fox River
Little Fox Creek
Big Creek
Creek
ILLINOIS CENTRAL
130

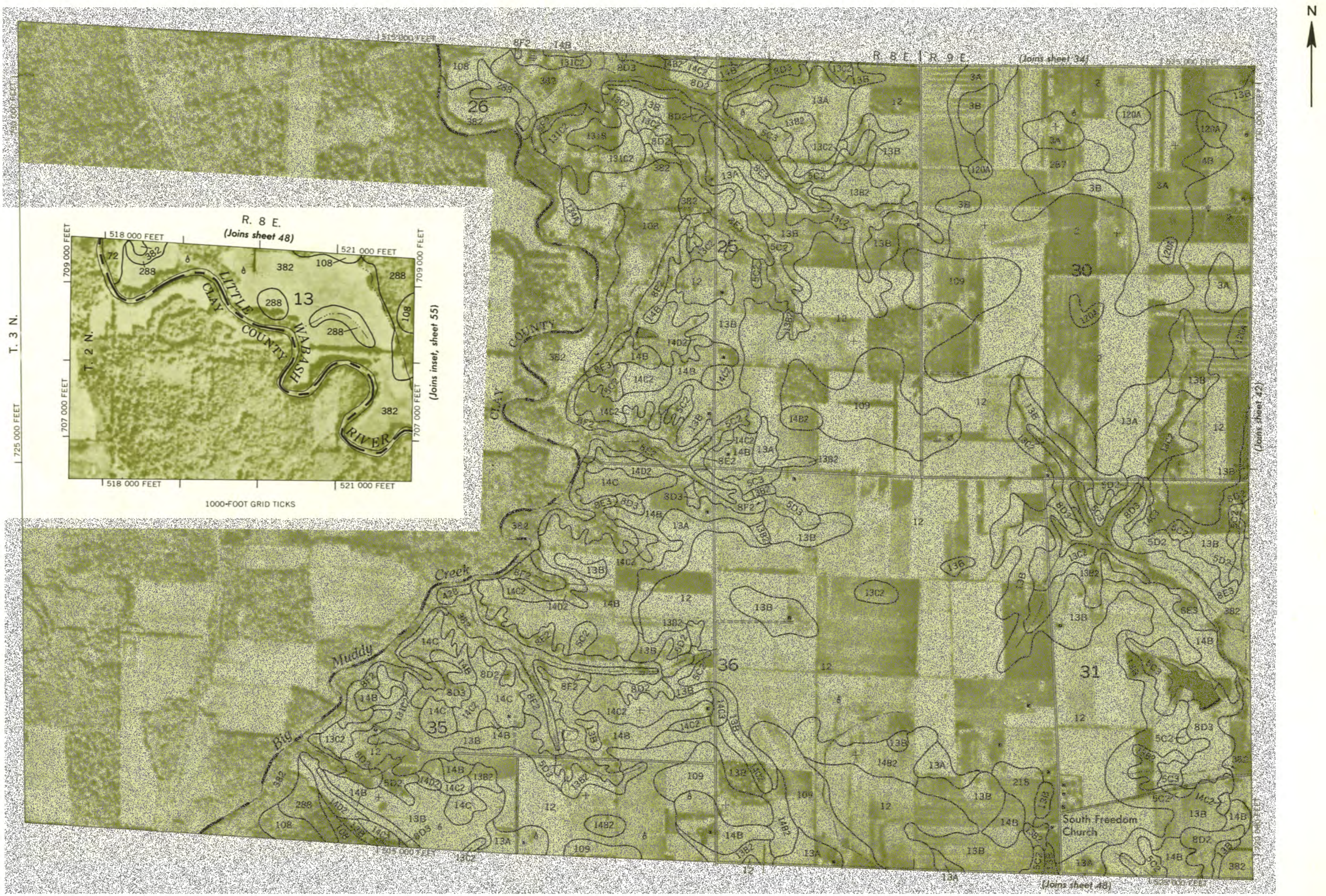

N
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
740 000 FEET
735 000 FEET
T. 3 N.
(Joins sheet 31)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 45)
Big Creek
Little Fox Creek
ILLINOIS CENTRAL
14
13
18
23
24
19

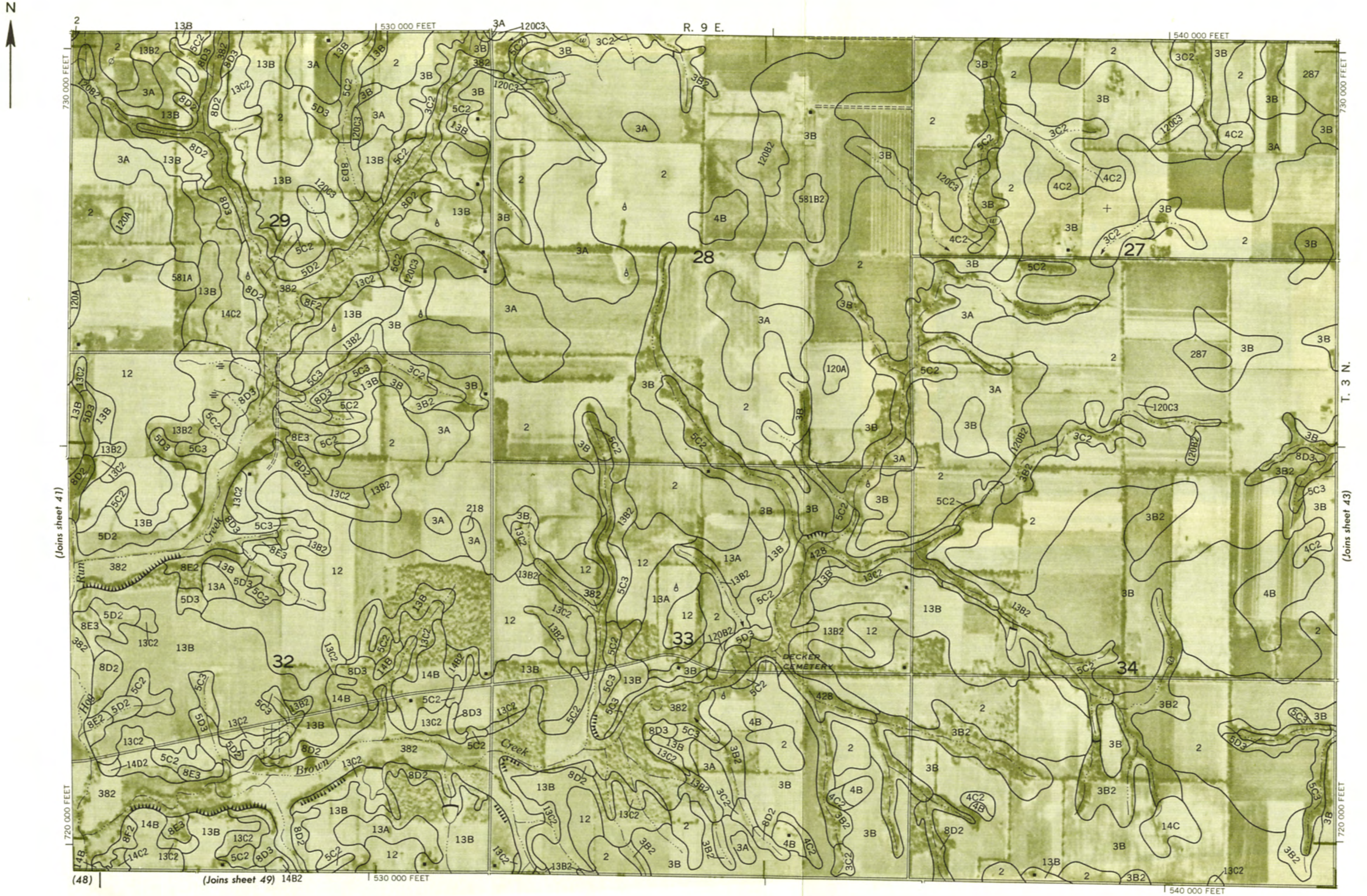

N
R. 14 W.
T. 3 N.
590 000 FEET
600 000 FEET
740 000 FEET
735 000 FEET
755 000 FEET
(Joins sheet 32)
(Joins sheet 40)
(Joins sheet 46)
(Joins sheet 38)
18
17
16
19
20
21
Bonpas Creek

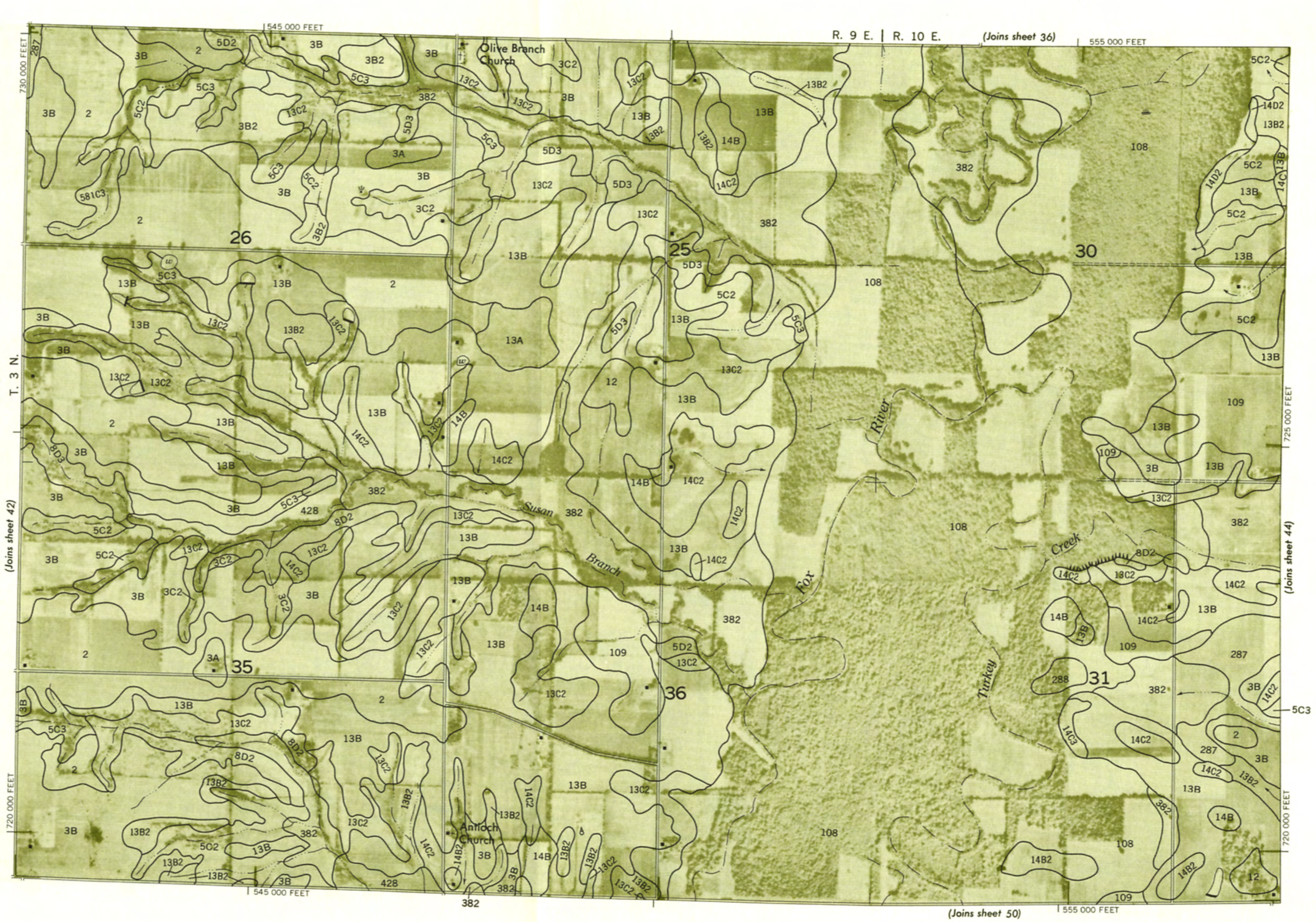

N
(Joins sheet 33)
R. 14 W.
605 000 FEET
620 000 FEET
740 000 FEET
735 000 FEET
(Joins sheet 39)
LAWRENCE COUNTY
T. 3 N.
(Joins sheet 47)
15
14
13
22
23
24

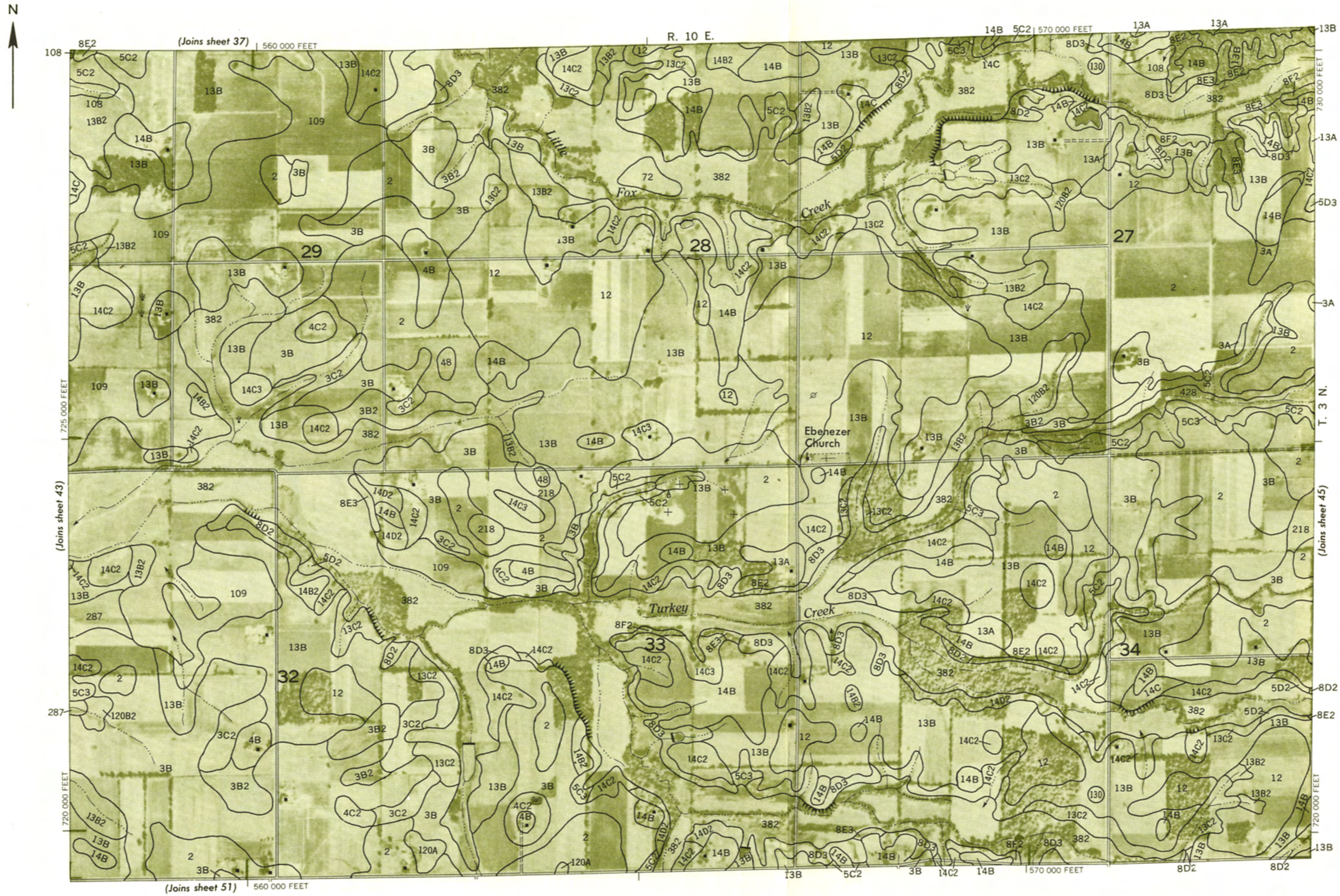
N

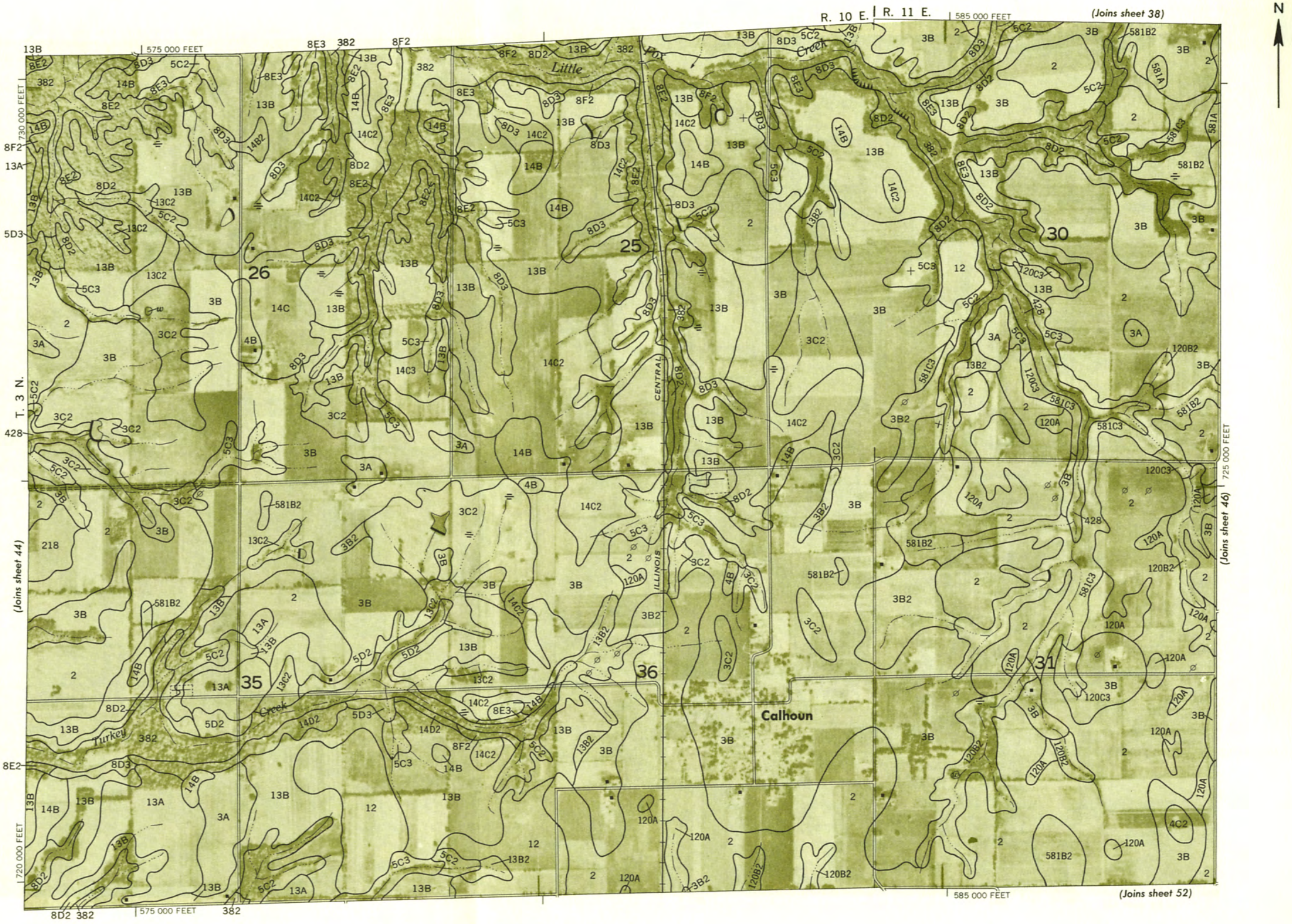

515 000 FEET
R. 8 E.
R. 9 E.
(Joins sheet 34)
525 000 FEET
730 000 FEET
725 000 FEET
720 000 FEET
T. 3 N.
(Joins sheet 42)
(Joins sheet 48)
26
25
30
35
36
31
CLAY COUNTY
Big Muddy Creek
South Freedom Church
R. 8 E.
(Joins sheet 48)
T. 2 N.
13
LITTLE WABASH RIVER
CLAY COUNTY
(Joins inset, sheet 55)


N
R. 8 E. | R. 9 E.
(Joins sheet 34)
(Joins sheet 42)
(Joins sheet 48)
T. 3 N.
725 000 FEET
26
25
30
31
35
36
CLAY COUNTY
Big Muddy Creek
South Freedom Church
R. 8 E.
(Joins sheet 48)
518 000 FEET
521 000 FEET
709 000 FEET
707 000 FEET
T. 2 N.
13
LITTLE WABASH RIVER
CLAY COUNTY
(Joins inset, sheet 55)
1000-FOOT GRID TICKS

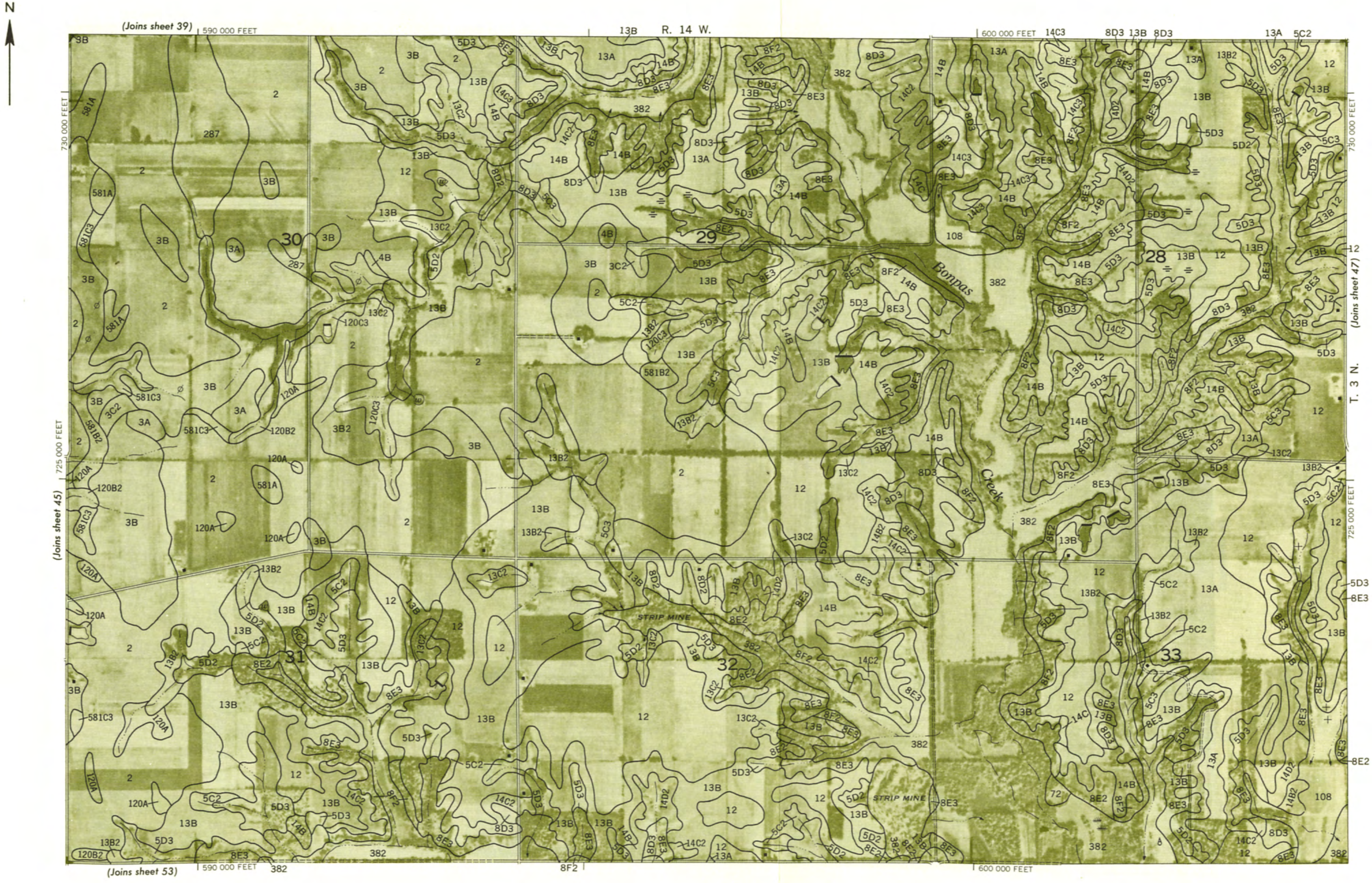

N
R. 9 E.
530 000 FEET
540 000 FEET
730 000 FEET
720 000 FEET
T. 3 N.
(Joins sheet 41)
(Joins sheet 43)
(48)
(Joins sheet 49)
29
28
27
32
33
34
DECKER CEMETERY
Run
Creek
Hog
Brown
Creek

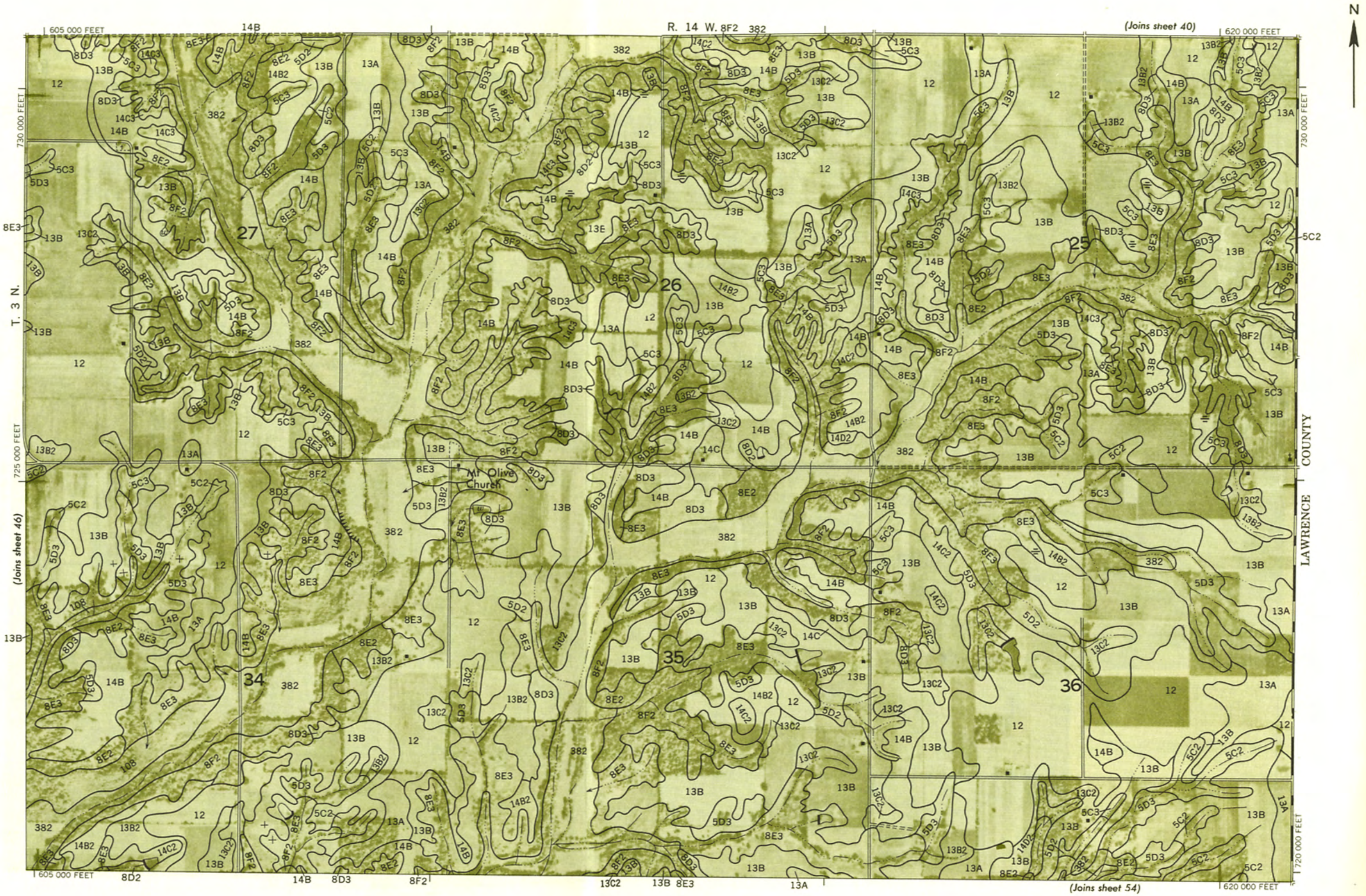

N
545 000 FEET
R. 9 E. | R. 10 E.
(Joins sheet 36)
555 000 FEET
730 000 FEET
725 000 FEET
720 000 FEET
T. 3 N.
(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 50)
Olive Branch Church
Antioch Church
Susan Branch
Fox River
Turkey Creek
26
25
30
35
36
31

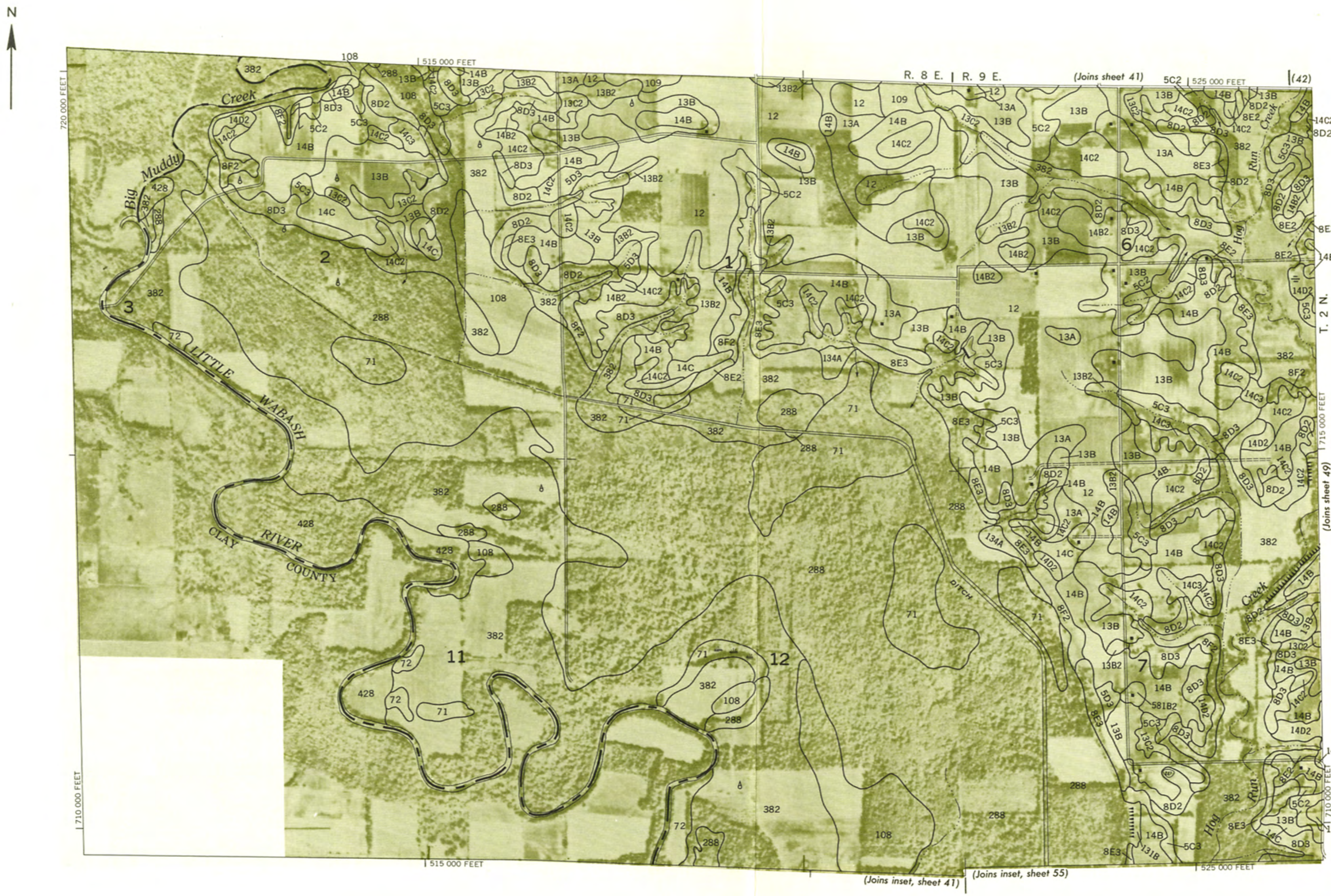

N
(Joins sheet 37)
560 000 FEET
R. 10 E.
570 000 FEET
730 000 FEET
725 000 FEET
720 000 FEET
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 51)
T. 3 N.
Little Fox Creek
Turkey Creek
Ebenezer Church
29
28
27
32
33
34

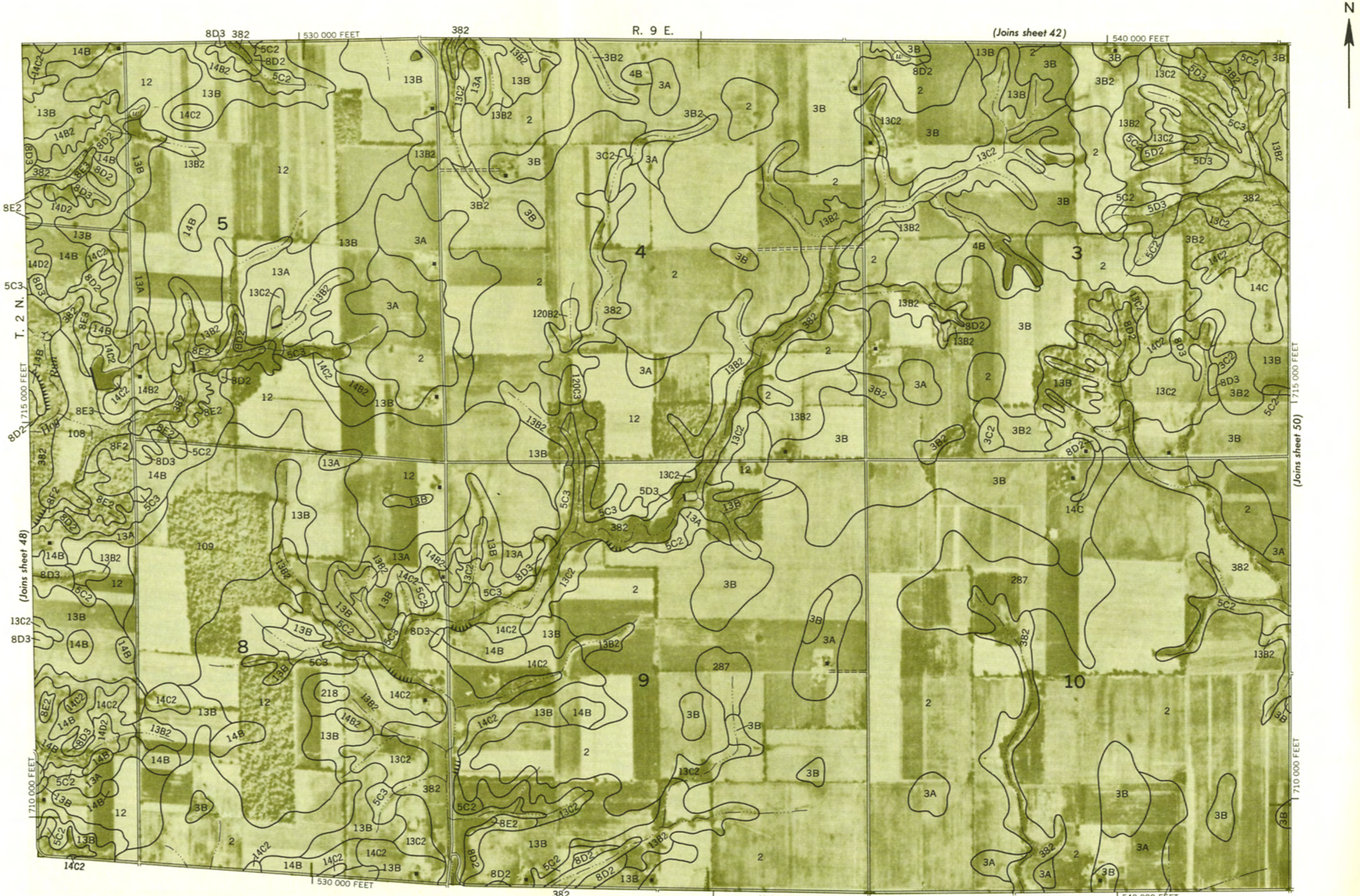

N
(Joins sheet 38)
R. 10 E.
R. 11 E.
575 000 FEET
585 000 FEET
730 000 FEET
725 000 FEET
720 000 FEET
T. 3 N.
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 52)
Little Fox Creek
Turkey Creek
CENTRAL ILLINOIS
Calhoun
25
26
30
31
35
36

46

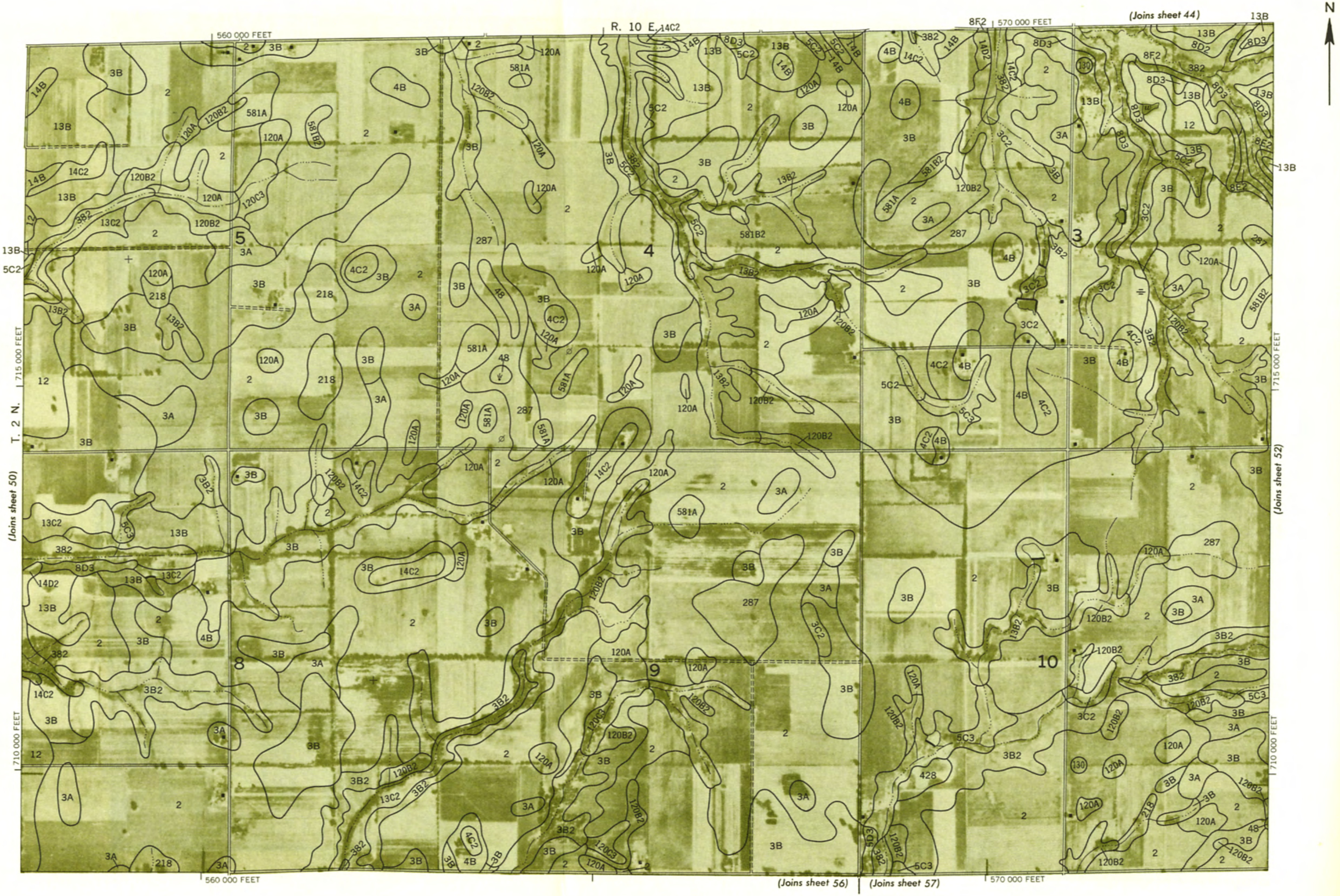

N
(Joins sheet 39)
590 000 FEET
R. 14 W.
600 000 FEET
730 000 FEET
725 000 FEET
(Joins sheet 45)
(Joins sheet 47)
T. 3 N.
(Joins sheet 53)
30
29
28
31
32
33
Bonpas
Creek
STRIP MINE
STRIP MINE


N
605 000 FEET
R. 14 W.
(Joins sheet 40)
620 000 FEET
730 000 FEET
725 000 FEET
720 000 FEET
T. 3 N.
(Joins sheet 46)
LAWRENCE COUNTY
(Joins sheet 54)
Mt Olive Church
27
26
25
34
35
36


N
515 000 FEET
525 000 FEET
720 000 FEET
715 000 FEET
710 000 FEET
R. 8 E. | R. 9 E.
(Joins sheet 41)
(42)
T. 2 N.
(Joins sheet 49)
(Joins inset, sheet 41)
(Joins inset, sheet 55)
Big Muddy Creek
LITTLE WABASH RIVER
CLAY COUNTY
DITCH
Hog Run Creek
Hog Run

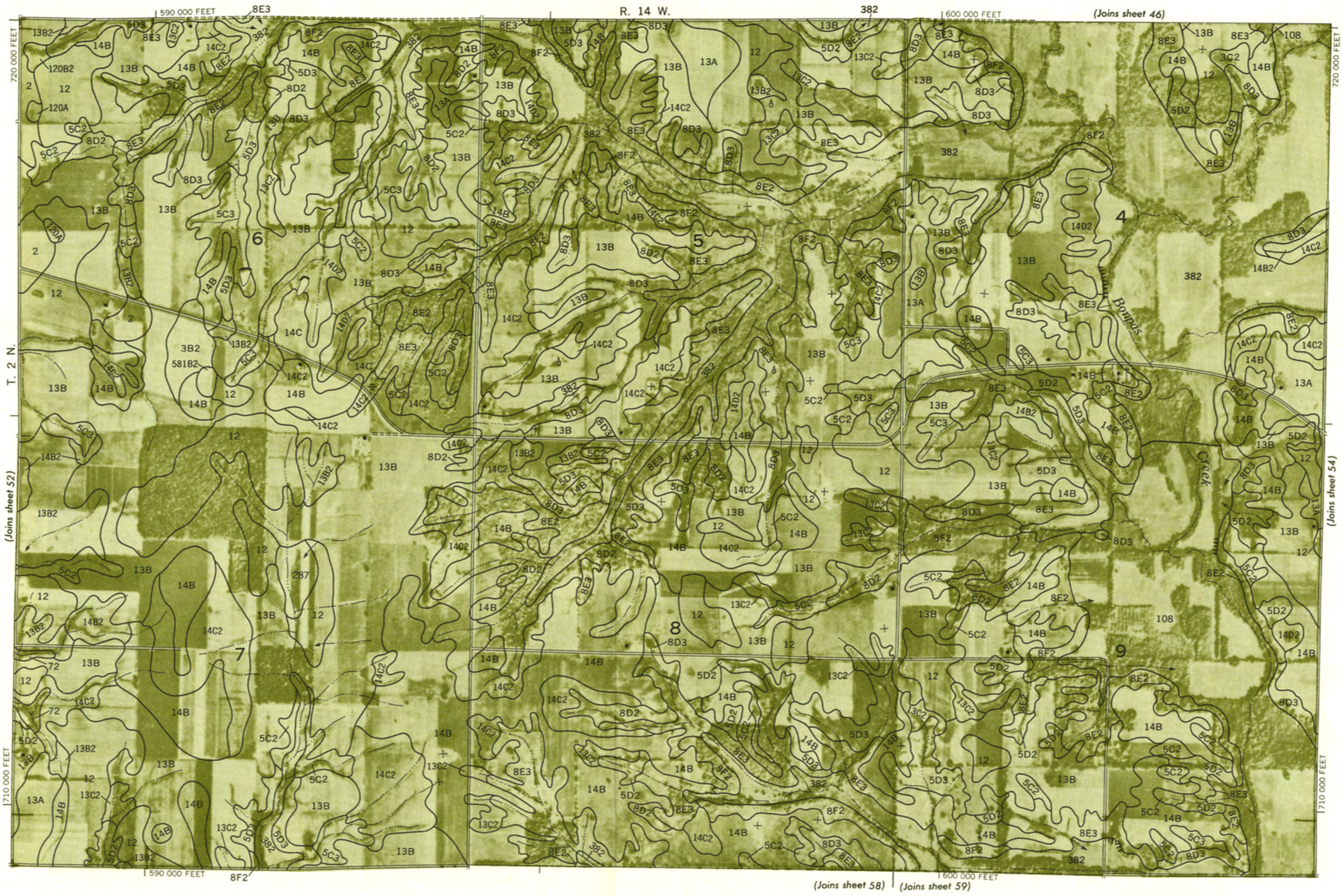

N
R. 9 E.
(Joins sheet 42)
530 000 FEET
540 000 FEET
T. 2 N.
715 000 FEET
710 000 FEET
(Joins sheet 48)
(Joins sheet 50)
(Joins inset, sheet 55)
(Joins sheet 55)
Hog Run
5
4
3
8
9
10


N
(Joins sheet 43)
545 000 FEET
R. 9 E.
R. 10 E.
555 000 FEET
T. 2 N.
715 000 FEET
710 000 FEET
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 55)
(Joins sheet 56)
Turkey Creek
Fox River
1
2
6
7
11
12

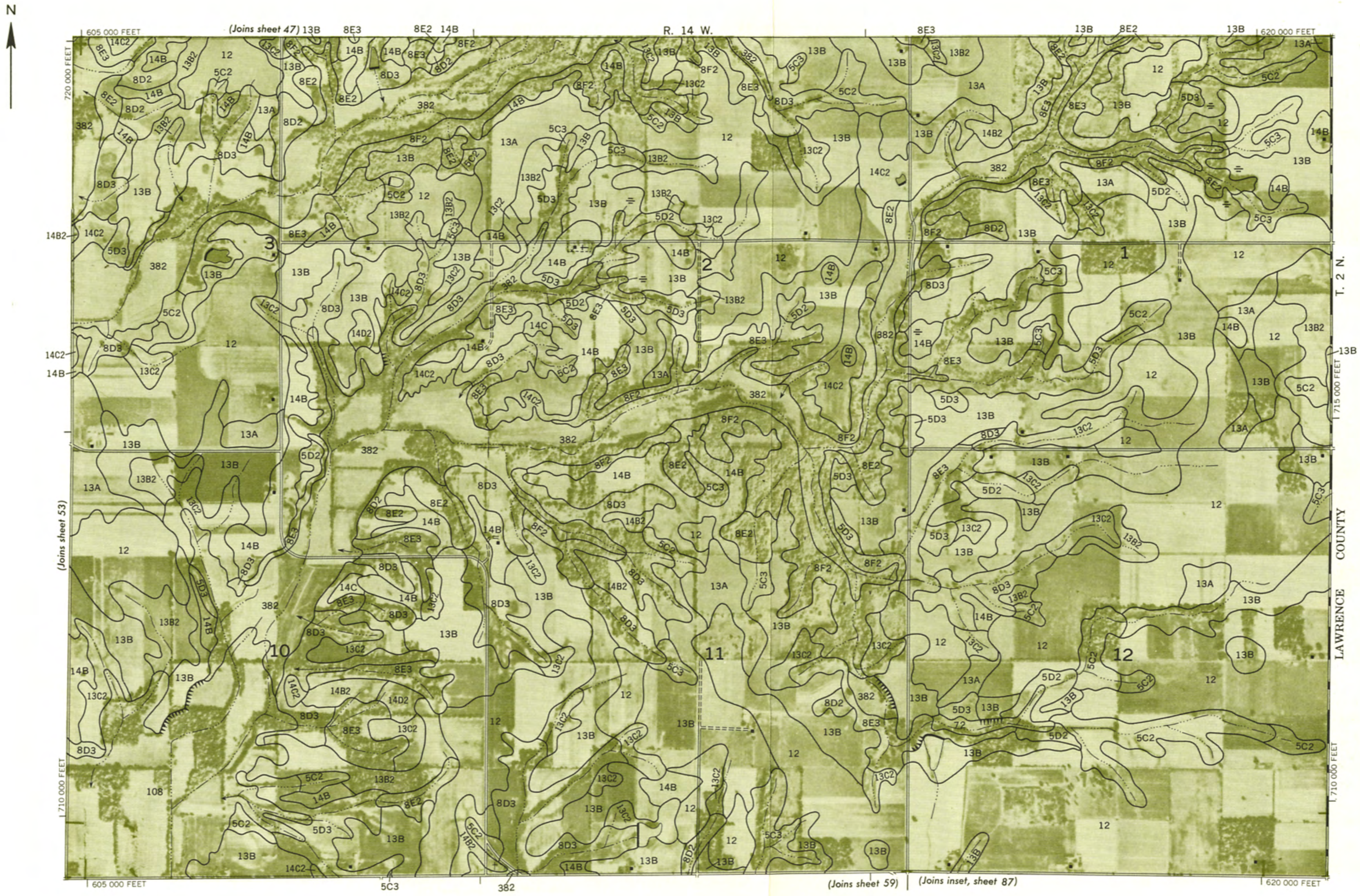

N
(Joins sheet 44)
R. 10 E.
T. 2 N.
560 000 FEET
570 000 FEET
715 000 FEET
710 000 FEET
(Joins sheet 50)
(Joins sheet 52)
(Joins sheet 56)
(Joins sheet 57)
5
4
3
8
9
10

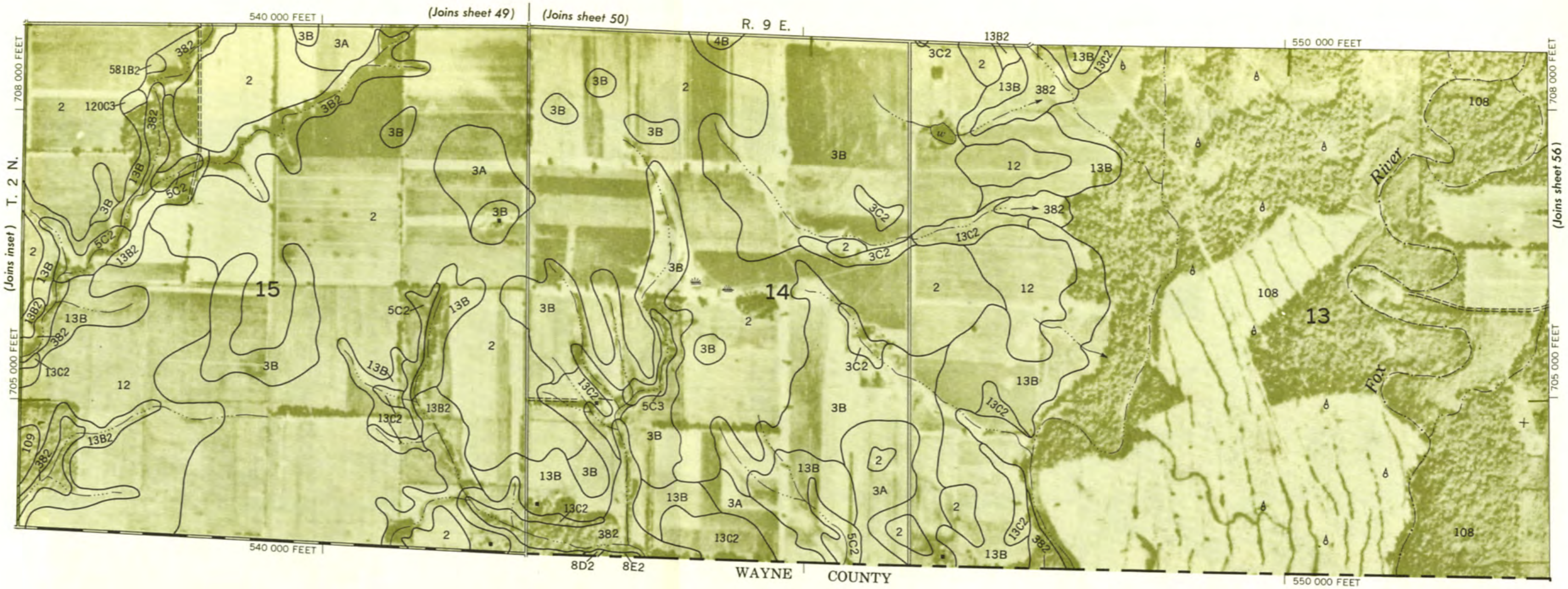

N
(Joins sheet 45)
575 000 FEET
R. 10 E.
R. 11 E.
585 000 FEET
720 000 FEET
715 000 FEET
710 000 FEET
T. 2 N.
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 57)
(Joins sheet 58)
CENTRAL
ILLINOIS
Sugar
Creek
1
2
6
7
11
12

N

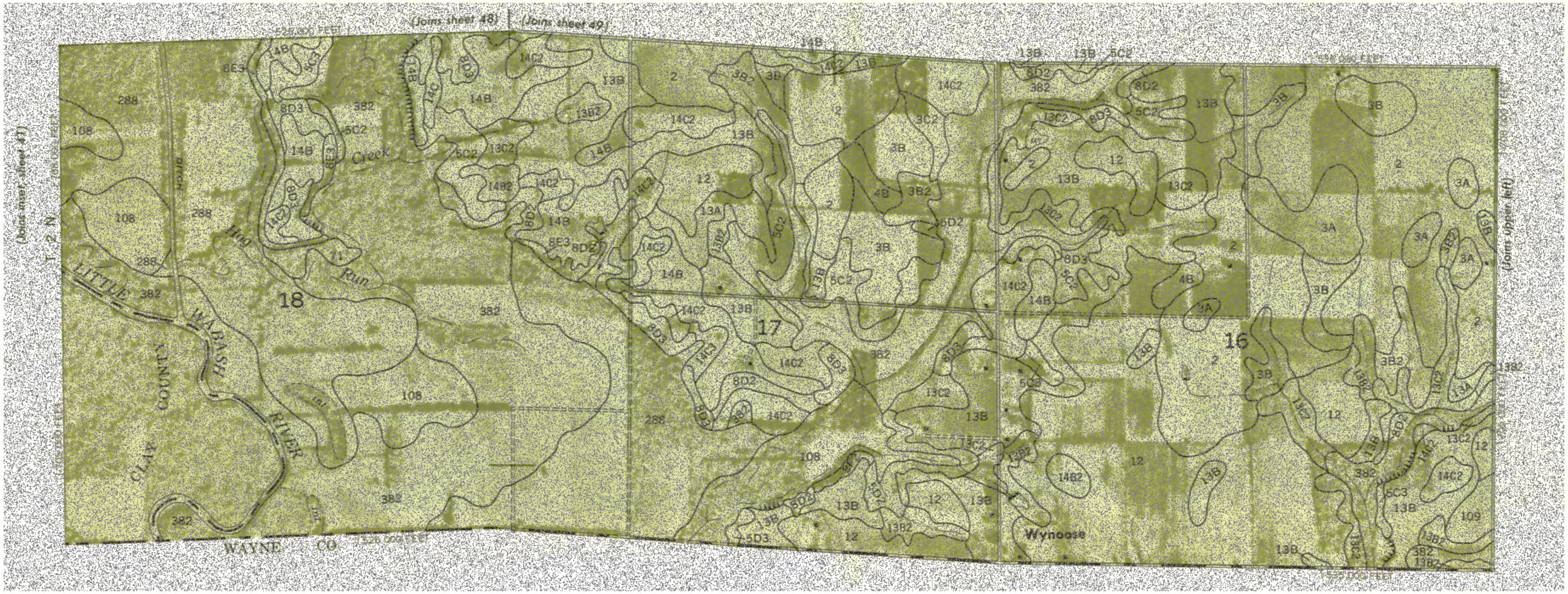

590 000 FEET
R. 14 W.
600 000 FEET
(Joins sheet 46)
720 000 FEET
T. 2 N.
(Joins sheet 52)
(Joins sheet 54)
710 000 FEET
Bonpas
Creek
4
5
6
7
8
9
(Joins sheet 58)
(Joins sheet 59)

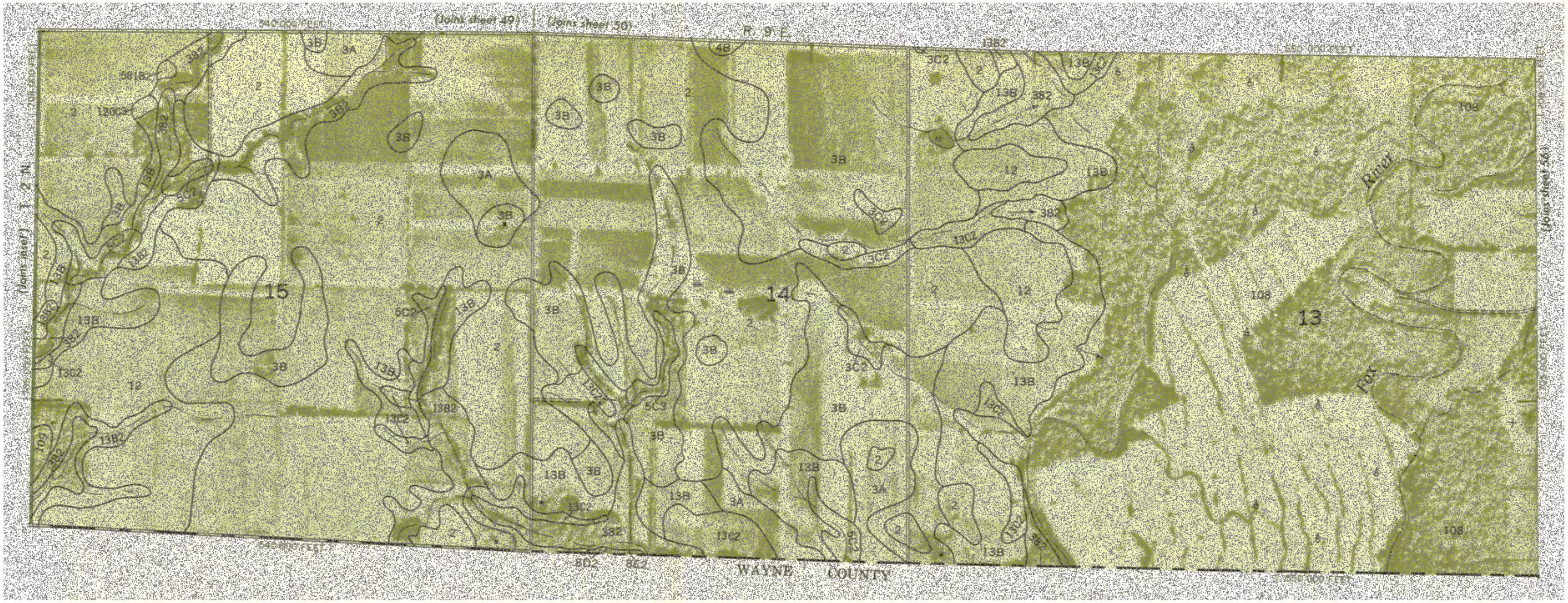
EDWARDS AND RICHLAND COUNTIES, ILLINOIS — SHEET NUMBER 54



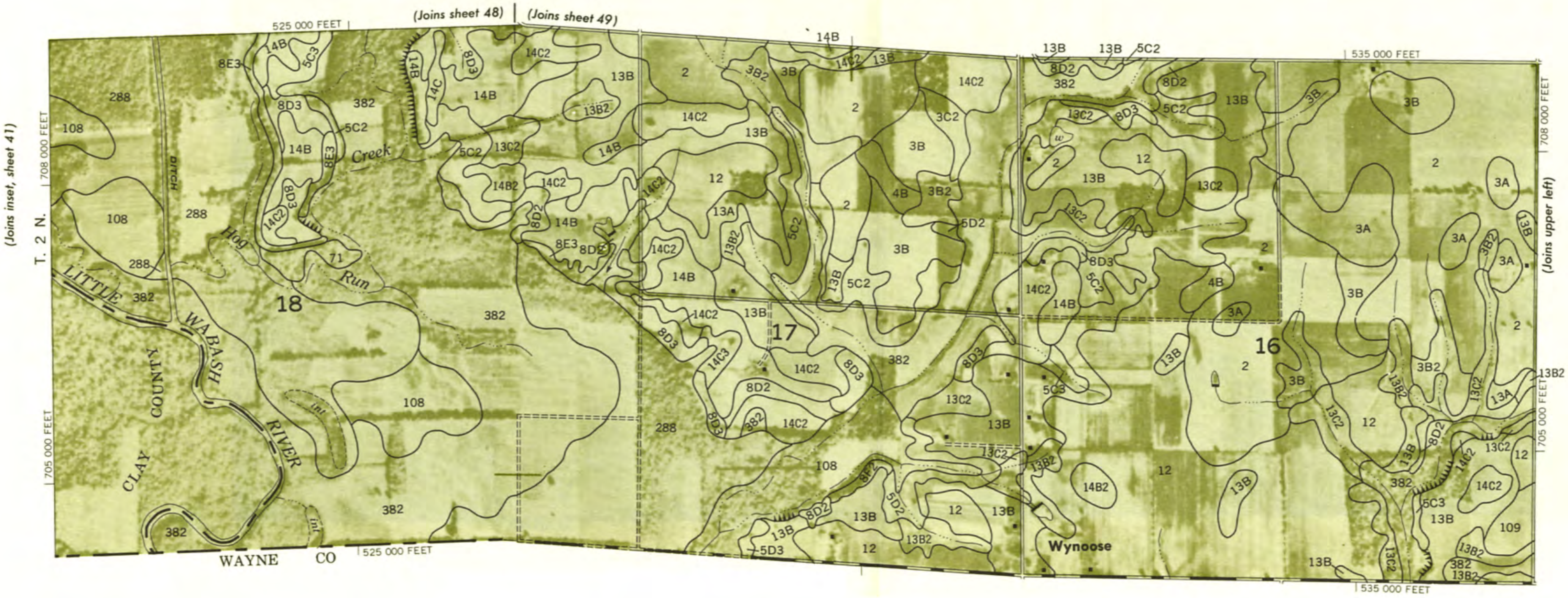


3000 AND 5000-FOOT GRID TICKS

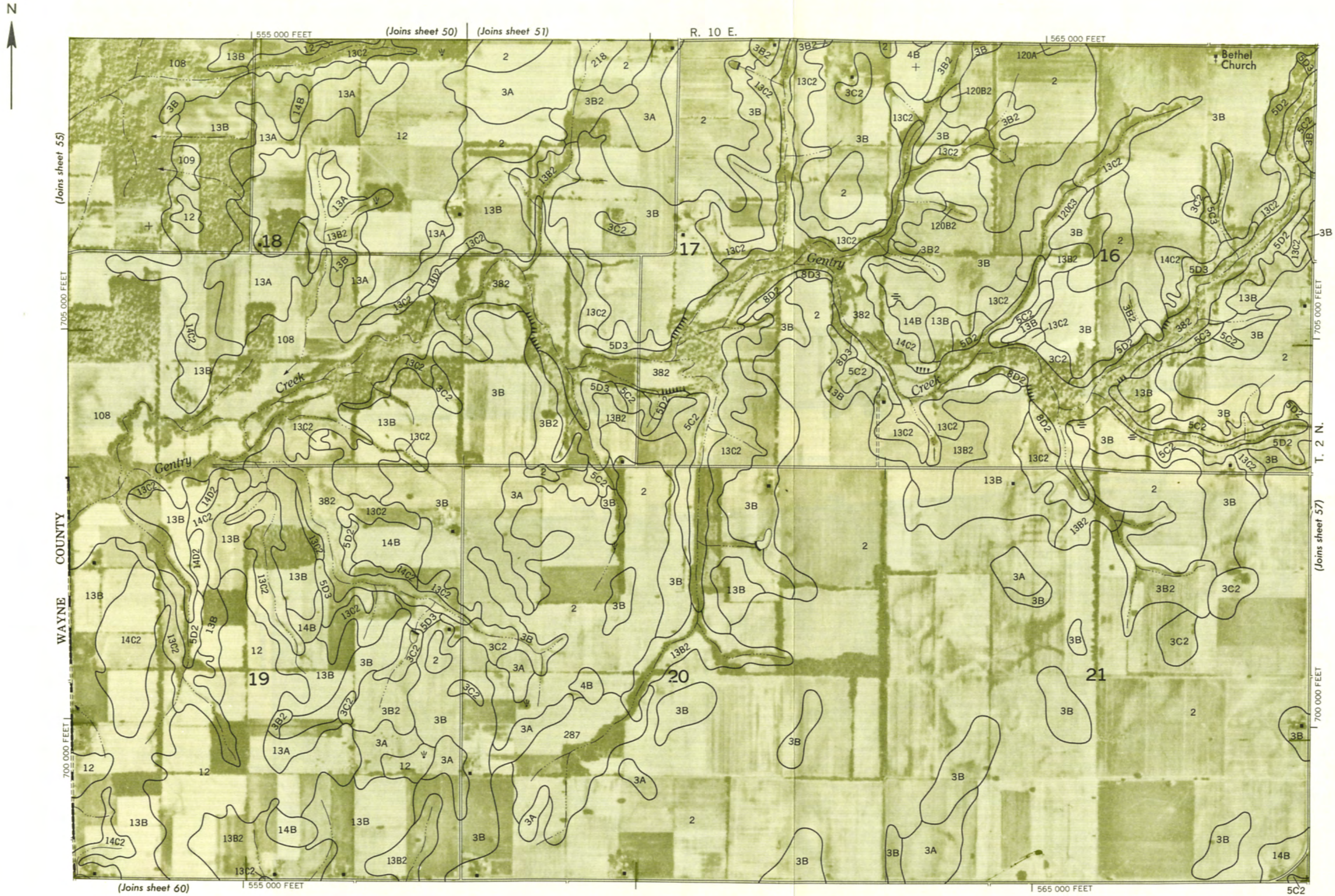


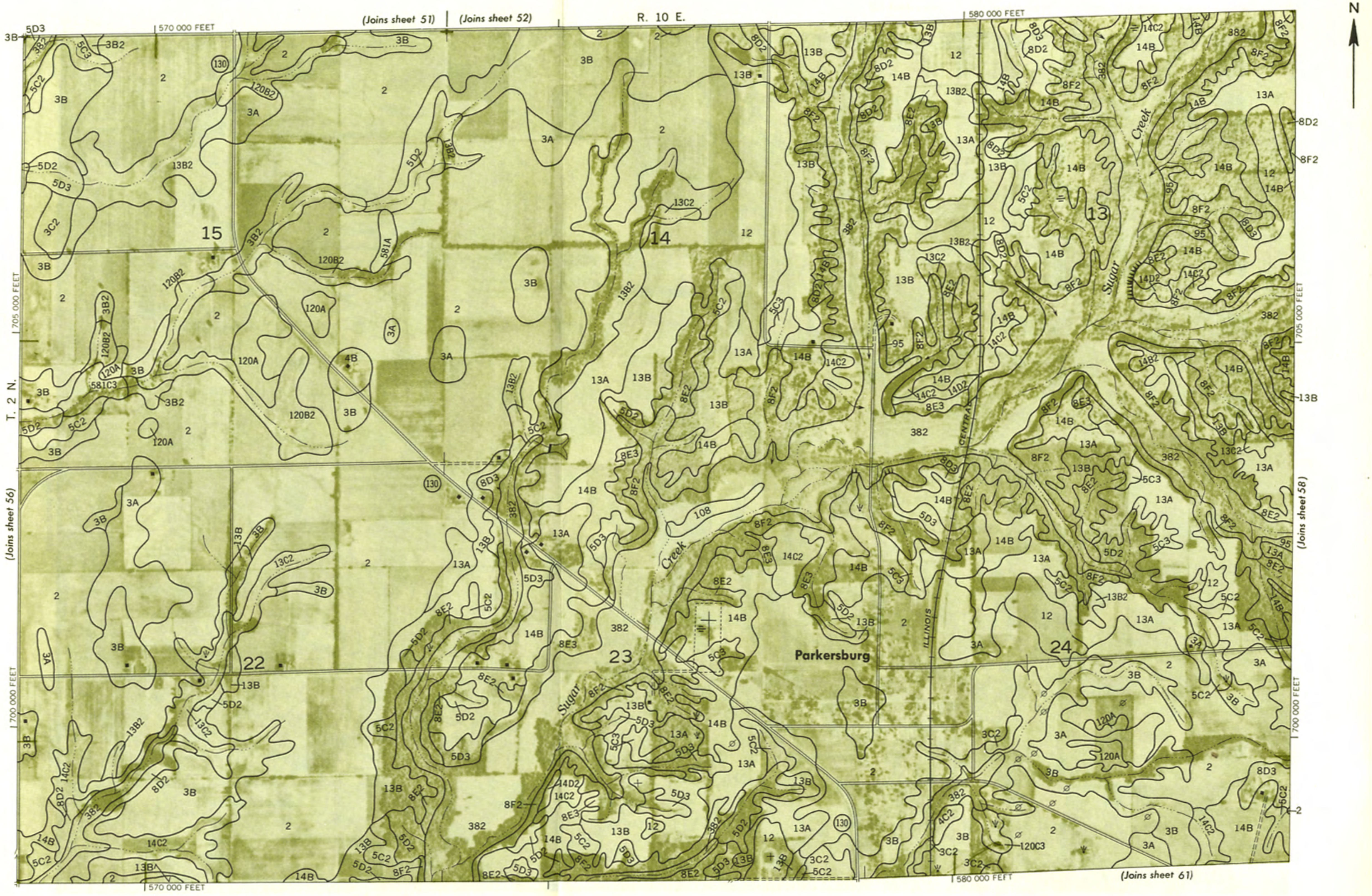


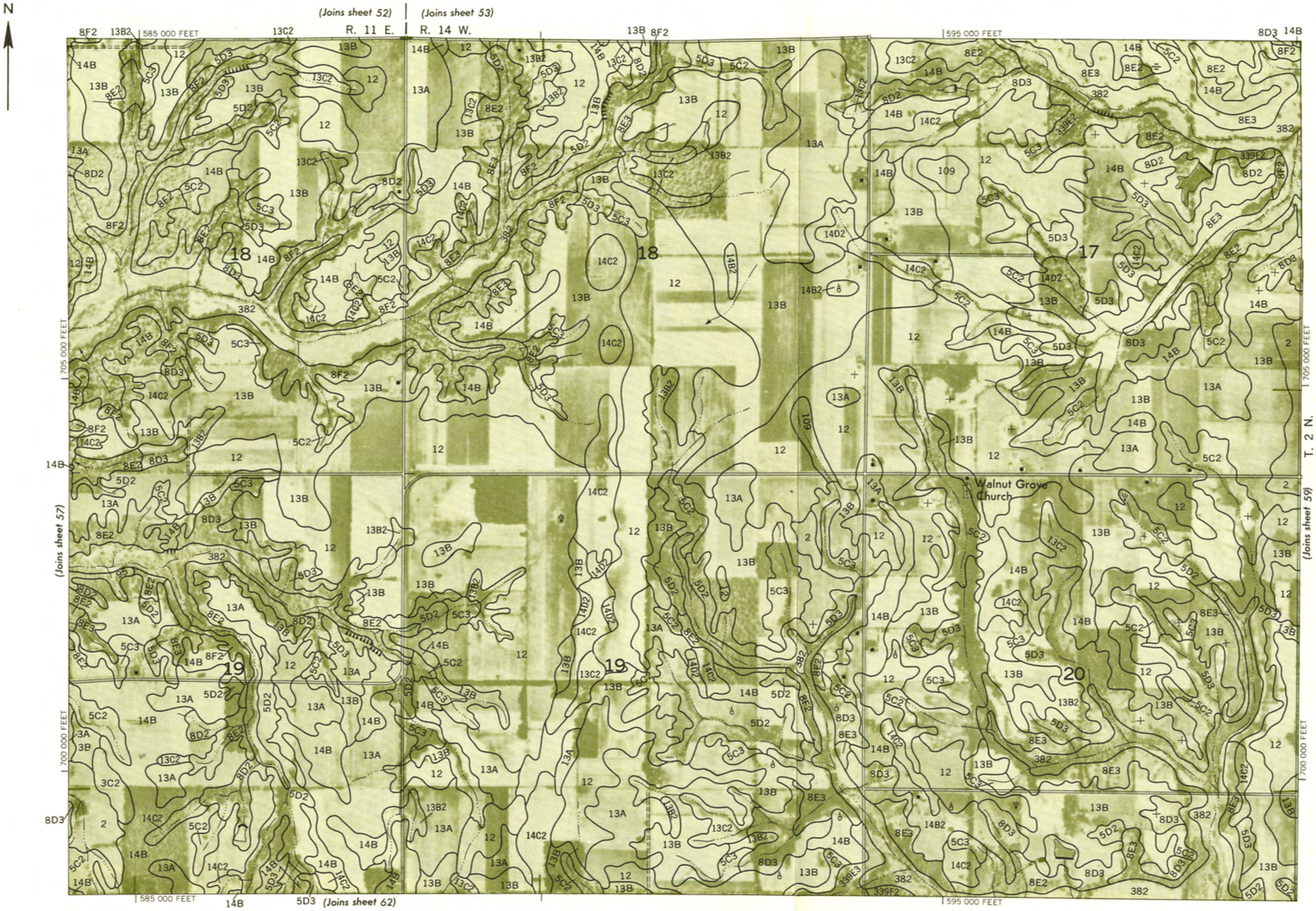
3000 AND 5000-FOOT GRID TICKS

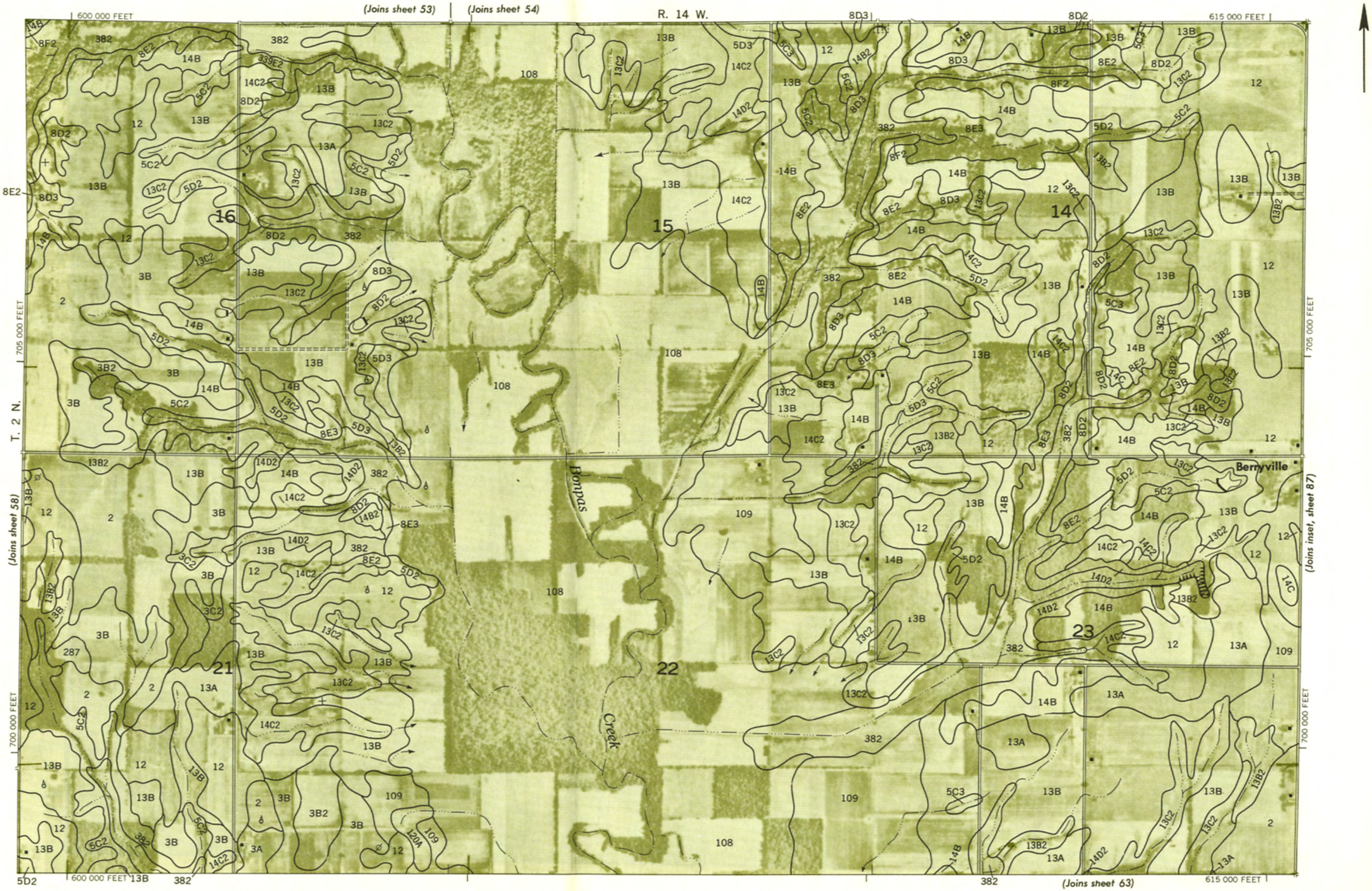


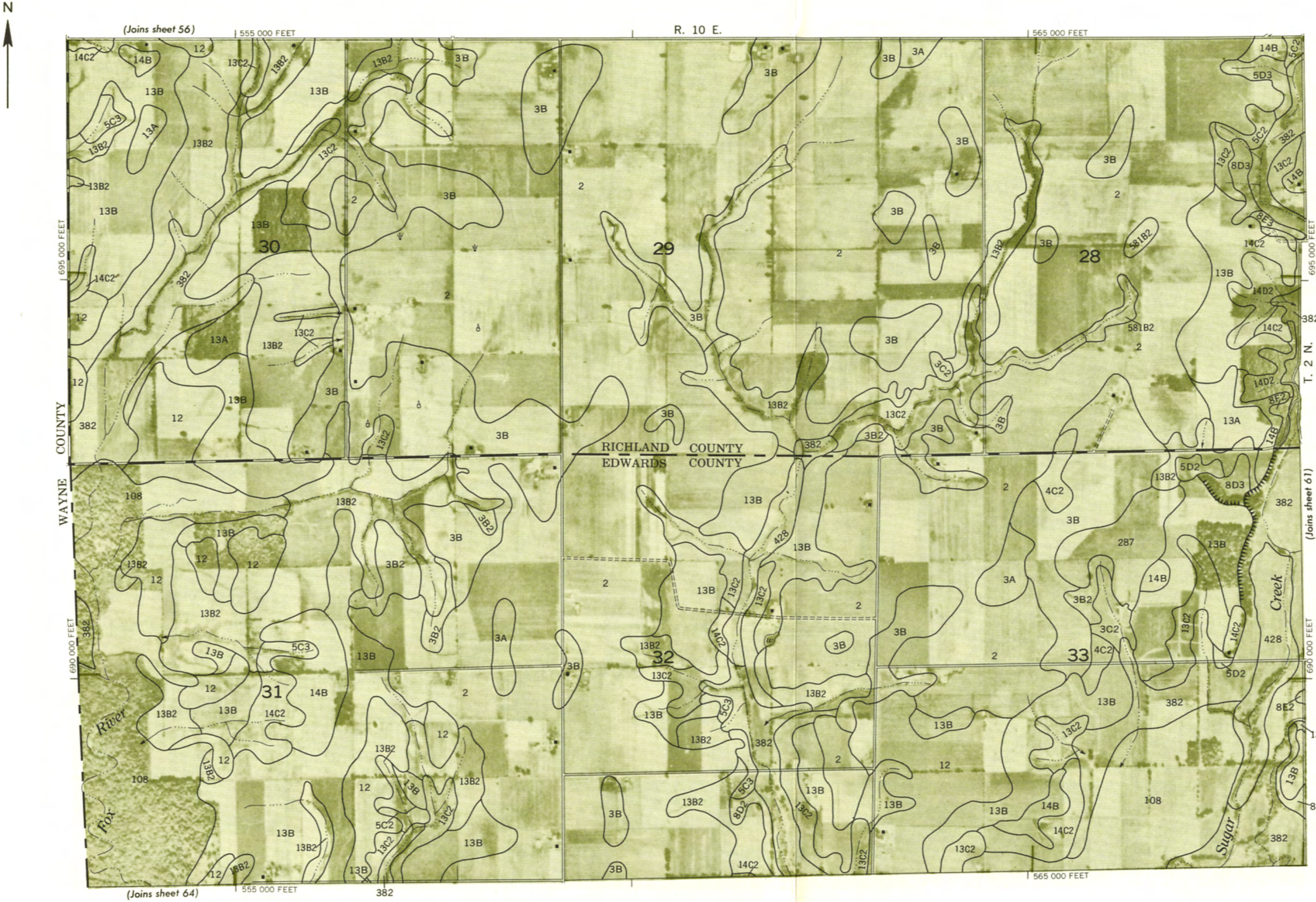
N

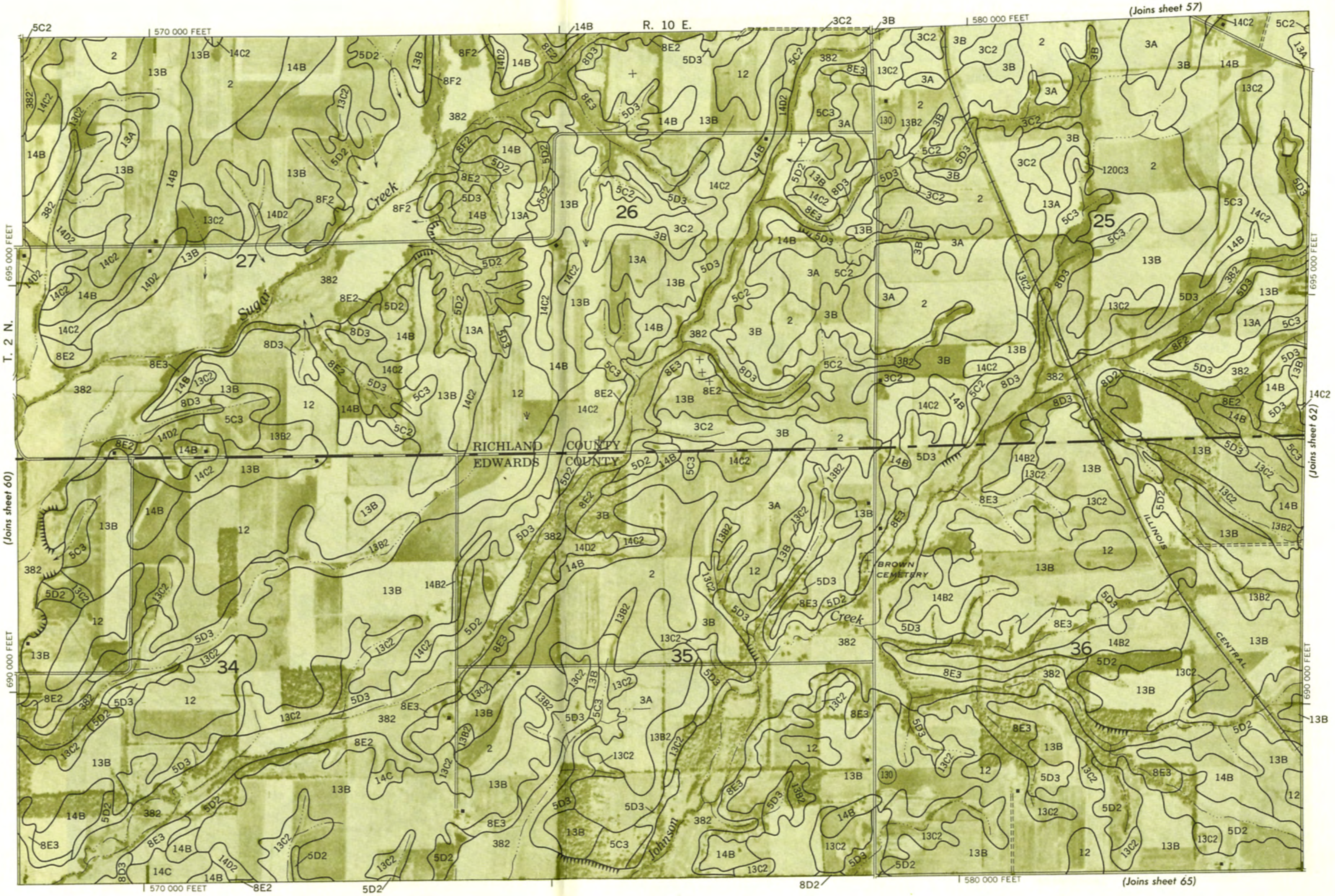

N
(Joins sheet 50)
(Joins sheet 51)
R. 10 E.
555 000 FEET
565 000 FEET
Bethel Church
(Joins sheet 55)
705 000 FEET
700 000 FEET
WAYNE COUNTY
(Joins sheet 57)
T. 2 N.
(Joins sheet 60)
Gentry Creek
18
17
16
19
20
21


(Joins sheet 51)
(Joins sheet 52)
R. 10 E.
570 000 FEET
580 000 FEET
N
705 000 FEET
700 000 FEET
T. 2 N.
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 61)
15
14
13
22
23
24
Parkersburg
Sugar Creek
Sugar
Creek
ILLINOIS CENTRAL
130

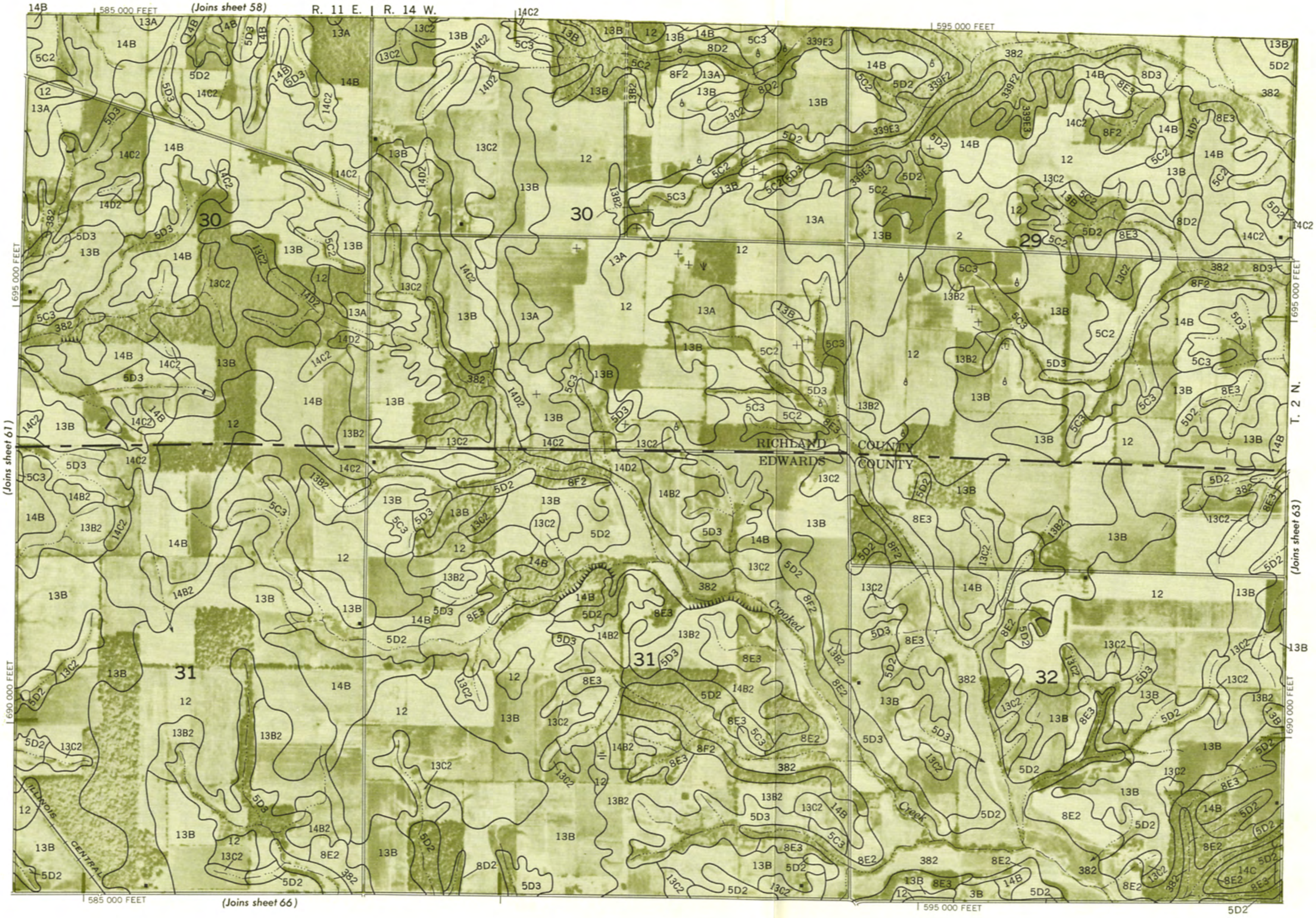

N
(Joins sheet 52)
(Joins sheet 53)
R. 11 E.
R. 14 W.
585 000 FEET
595 000 FEET
705 000 FEET
700 000 FEET
T. 2 N.
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 62)
Walnut Grove Church
18
18
17
19
19
20


(Joins sheet 53)
(Joins sheet 54)
R. 14 W.
600 000 FEET
615 000 FEET
705 000 FEET
700 000 FEET
T. 2 N.
(Joins sheet 58)
(Joins inset, sheet 87)
(Joins sheet 63)
N
16
15
14
21
22
23
Berryville
Bonpas
Creek


N
(Joins sheet 56)
555 000 FEET
R. 10 E.
565 000 FEET
695 000 FEET
690 000 FEET
T. 2 N.
(Joins sheet 61)
(Joins sheet 64)
WAYNE COUNTY
RICHLAND COUNTY
EDWARDS COUNTY
30
29
28
31
32
33
Fox River
Sugar Creek
14C2
14B
12
13C2
13B2
13B
3B
3A
5C2
5D3
5C3
13A
382
8D3
8E3
14D2
581B2
2
13C2
3C2
14D2
8E2
13A
108
3B2
428
287
4C2
5D2
3C2
8E2
13C2
8E2
3A
14C2
8D2
5C2
13C2
382

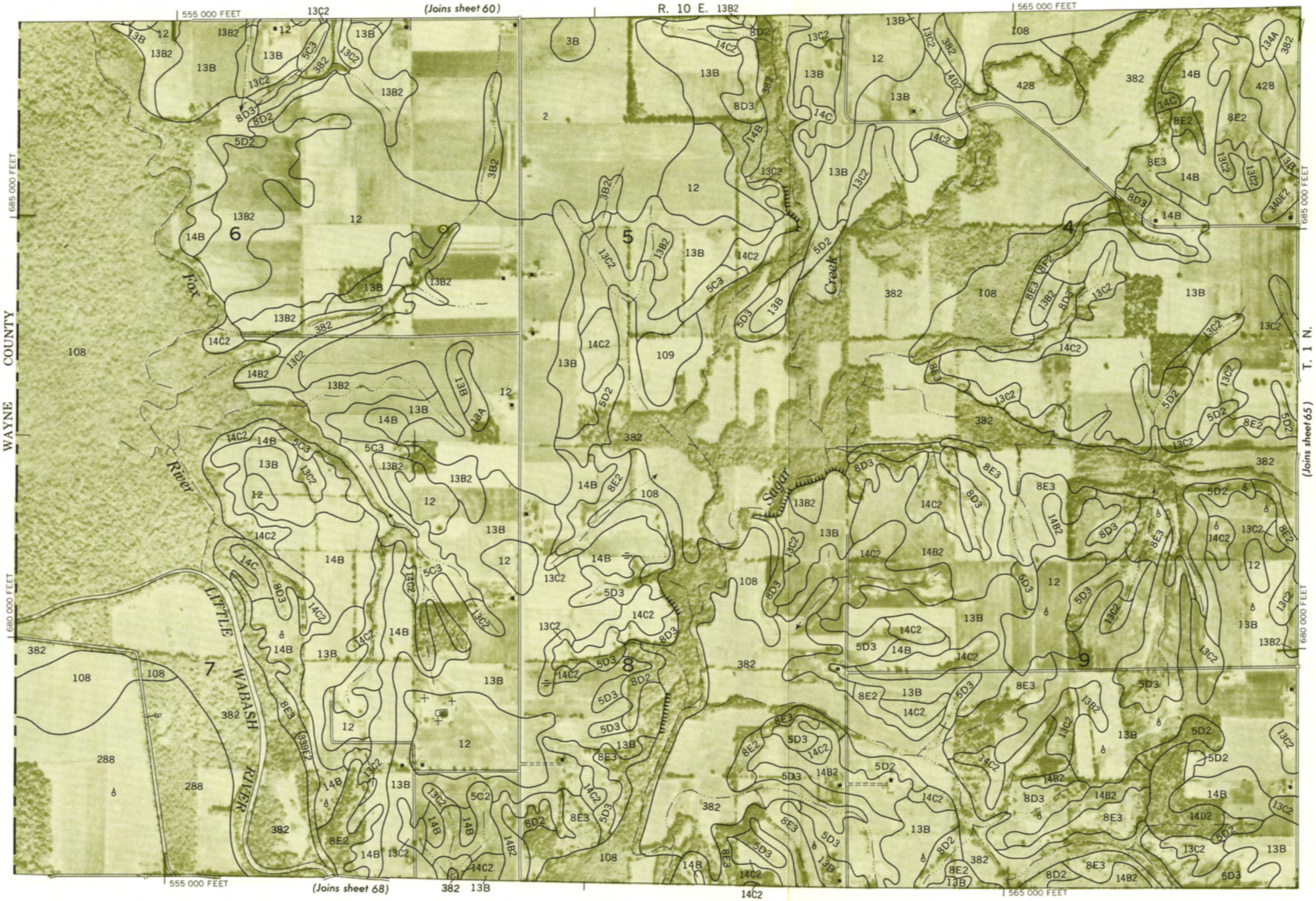

N
(Joins sheet 57)
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 65)
R. 10 E.
T. 2 N.
570 000 FEET
580 000 FEET
695 000 FEET
690 000 FEET
RICHLAND COUNTY
EDWARDS COUNTY
Sugar Creek
Johnson Creek
BROWN CEMETERY
ILLINOIS CENTRAL
27
26
25
34
35
36
130

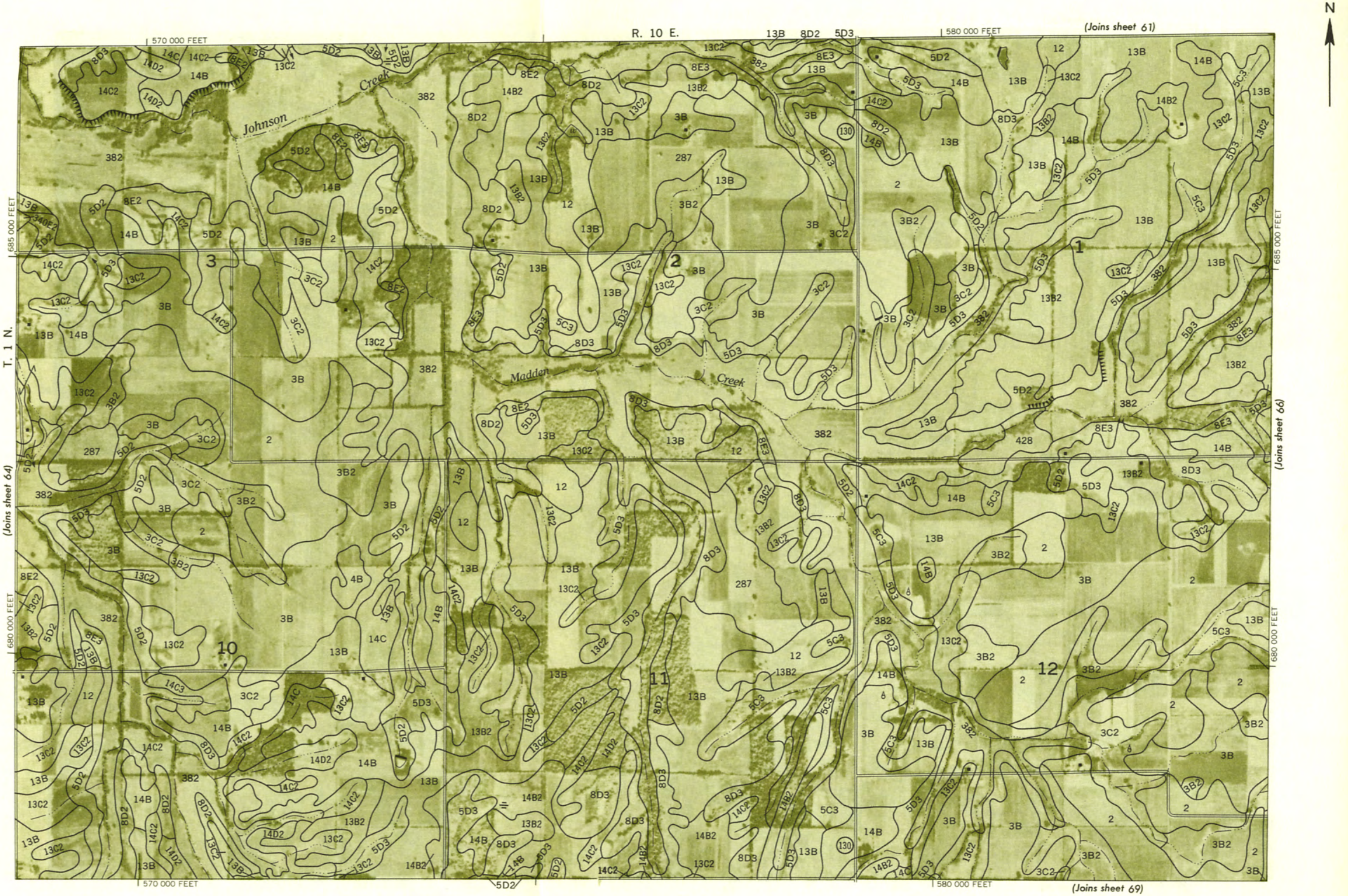
N

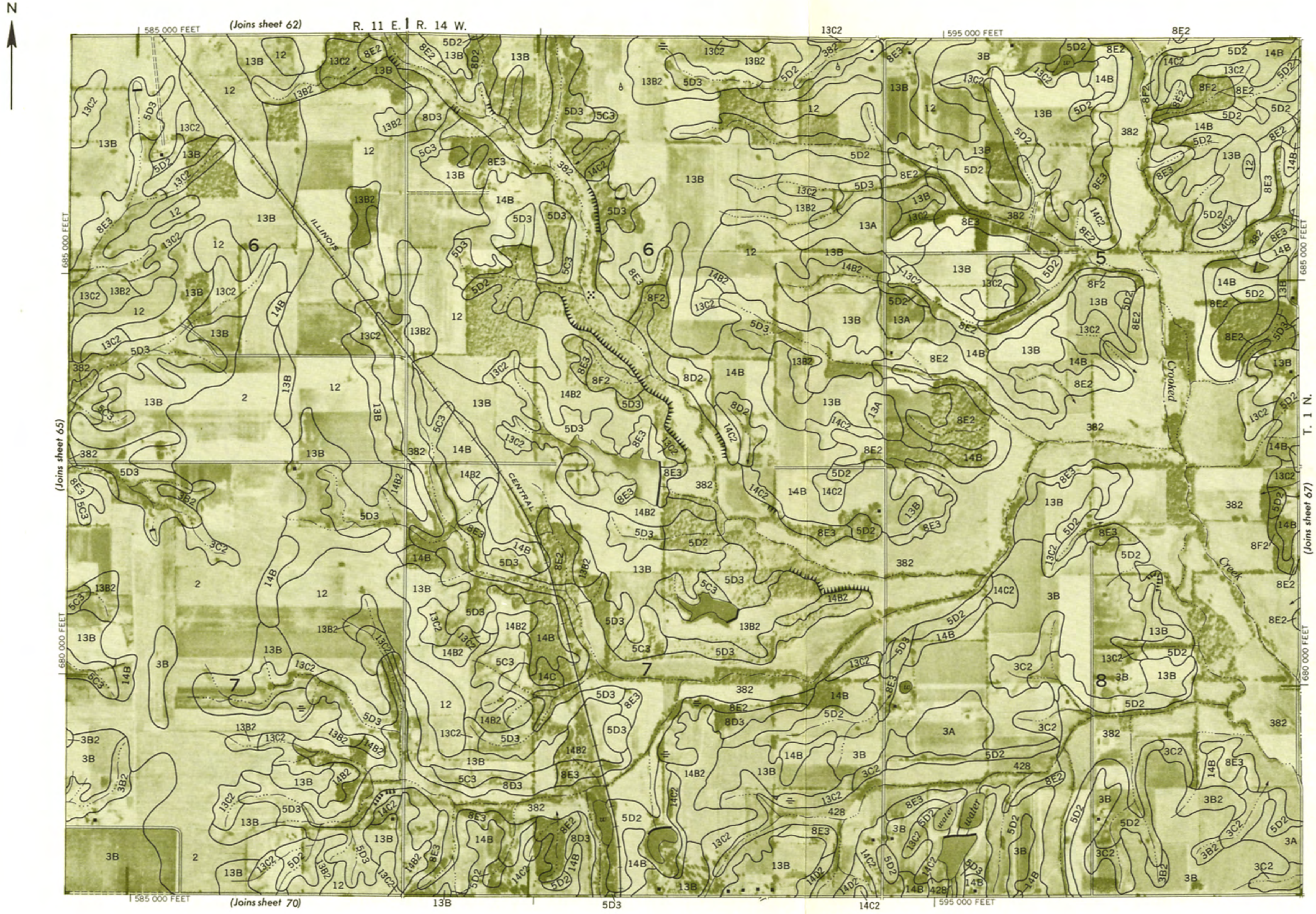

(Joins sheet 58)
R. 11 E.
R. 14 W.
585 000 FEET
595 000 FEET
695 000 FEET
690 000 FEET
(Joins sheet 61)
(Joins sheet 63)
(Joins sheet 66)
T. 2 N.
RICHLAND COUNTY
EDWARDS COUNTY
Crooked Creek
ILLINOIS CENTRAL
30
29
31
32

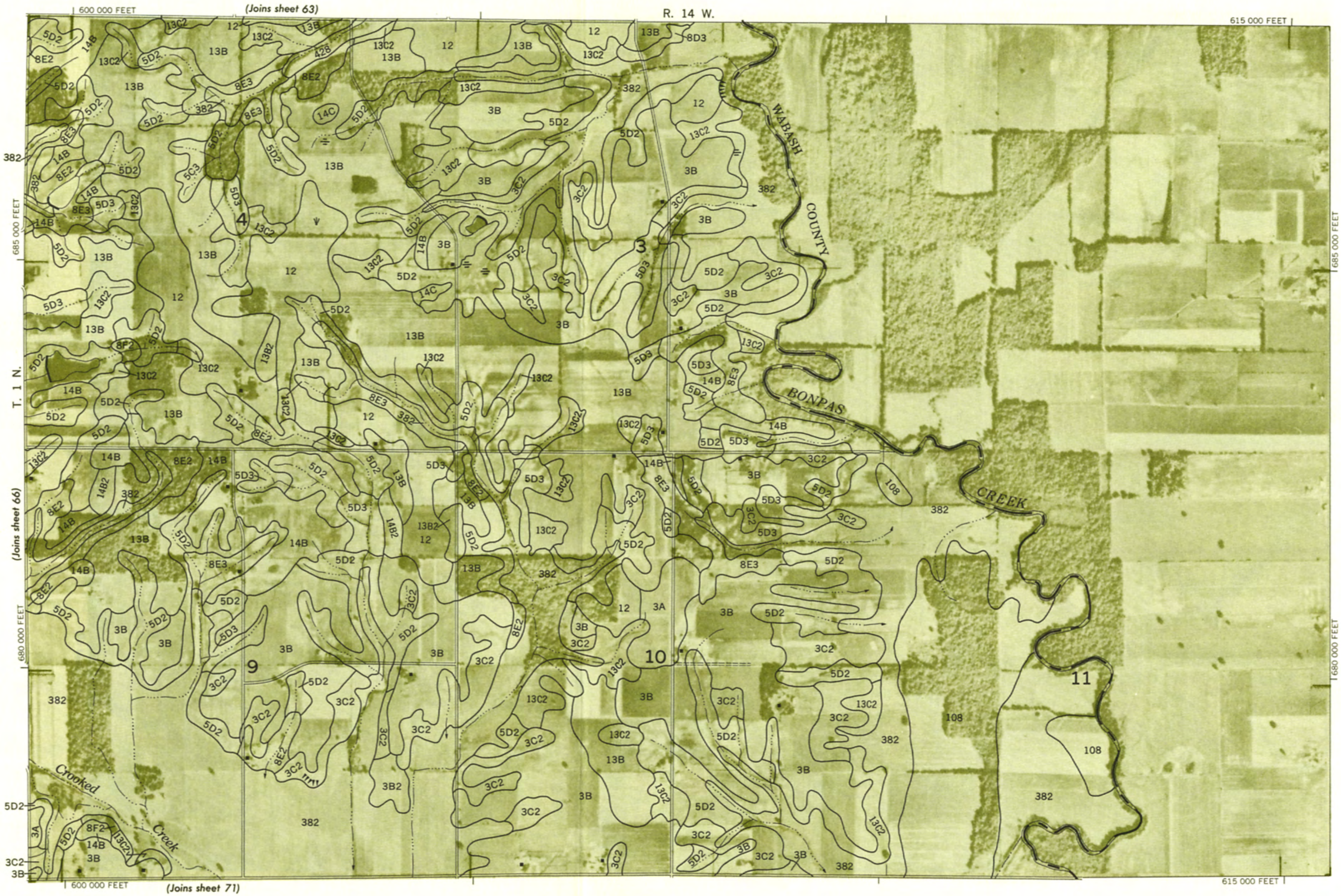

N
(Joins sheet 59)
(Joins sheet 67)
(Joins sheet 62)
(Joins inset, sheet 91)
R. 14 W.
T. 2 N.
600 000 FEET
615 000 FEET
695 000 FEET
690 000 FEET
RICHLAND COUNTY
EDWARDS COUNTY
COUNTY
Bonpas Creek
WABASH
BONPAS CREEK
28
27
26
33
34

N

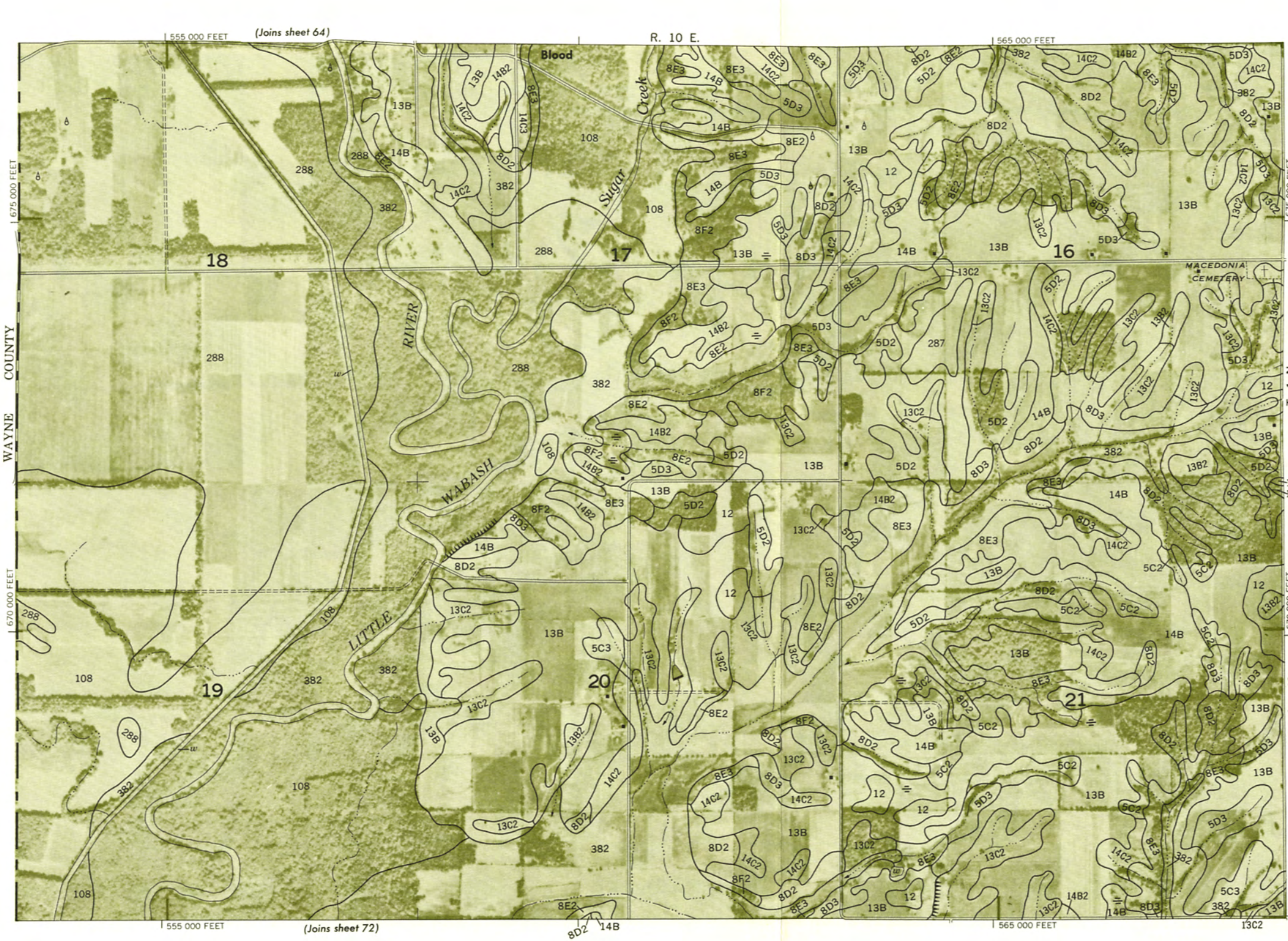

(Joins sheet 60)
R. 10 E.
555 000 FEET
565 000 FEET
685 000 FEET
680 000 FEET
WAYNE COUNTY
T. 1 N.
(Joins sheet 65)
(Joins sheet 68)
Fox River
LITTLE WABASH RIVER
Sugar Creek
6
5
4
7
8
9


N
R. 10 E.
T. 1 N.
570 000 FEET
580 000 FEET
685 000 FEET
680 000 FEET
(Joins sheet 61)
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 69)
Johnson Creek
Madden Creek
1
2
3
10
11
12

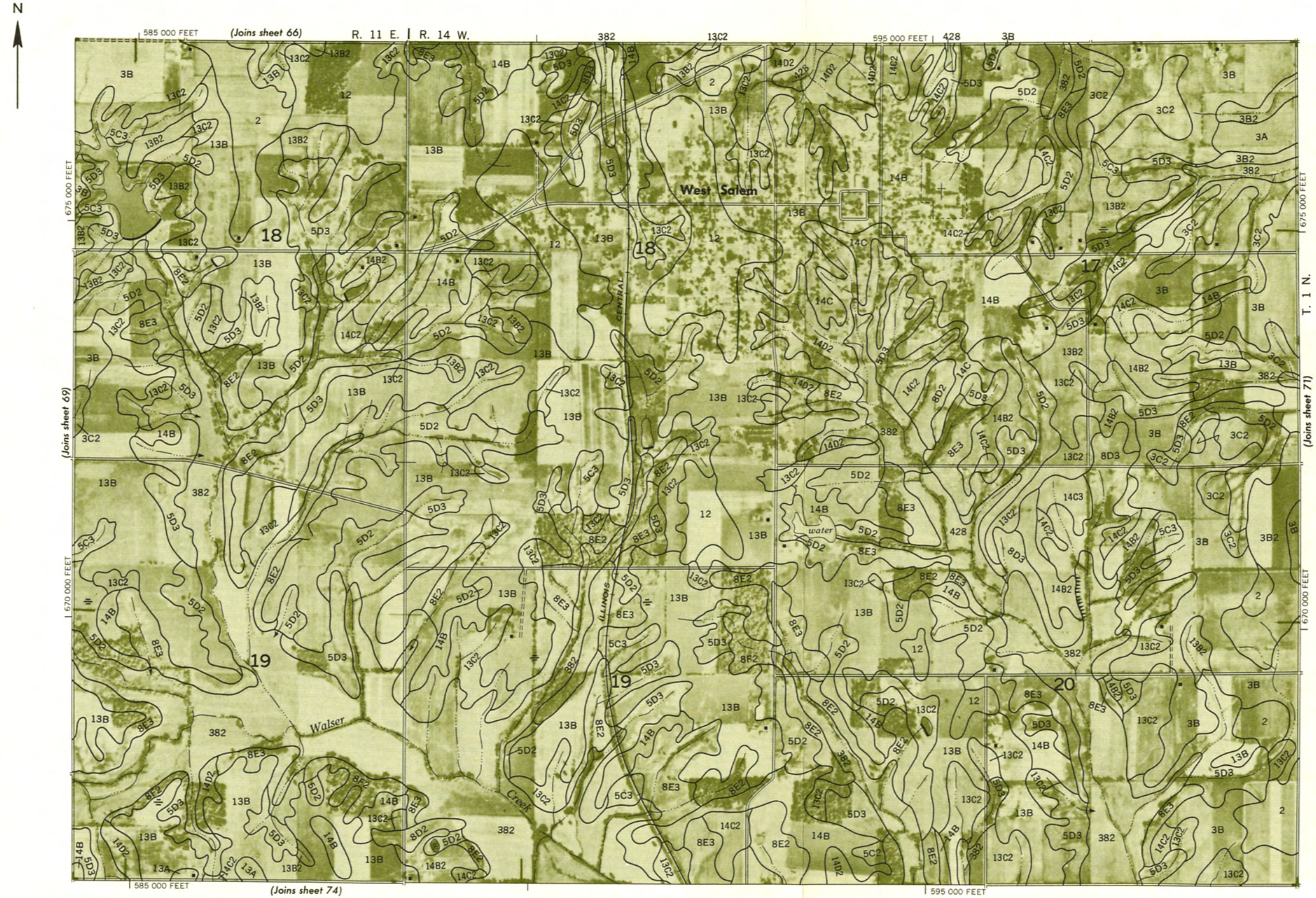

N
(Joins sheet 62)
R. 11 E. | R. 14 W.
585 000 FEET
595 000 FEET
685 000 FEET
680 000 FEET
(Joins sheet 65)
(Joins sheet 67)
(Joins sheet 70)
T. 1 N.
ILLINOIS
CENTRAL
Crooked
Creek
water


(Joins sheet 63)
600 000 FEET
R. 14 W.
615 000 FEET
685 000 FEET
680 000 FEET
T. 1 N.
(Joins sheet 66)
WABASH COUNTY
BONPAS CREEK
Crooked Creek
(Joins sheet 71)
3
4
9
10
11

N


N
(Joins sheet 64)
555 000 FEET
R. 10 E.
565 000 FEET
Blood
Sugar Creek
675 000 FEET
670 000 FEET
WAYNE COUNTY
T. 1 N.
18
17
16
19
20
21
MACEDONIA CEMETERY
LITTLE WABASH RIVER
(Joins sheet 69)
(Joins sheet 72)
555 000 FEET
565 000 FEET

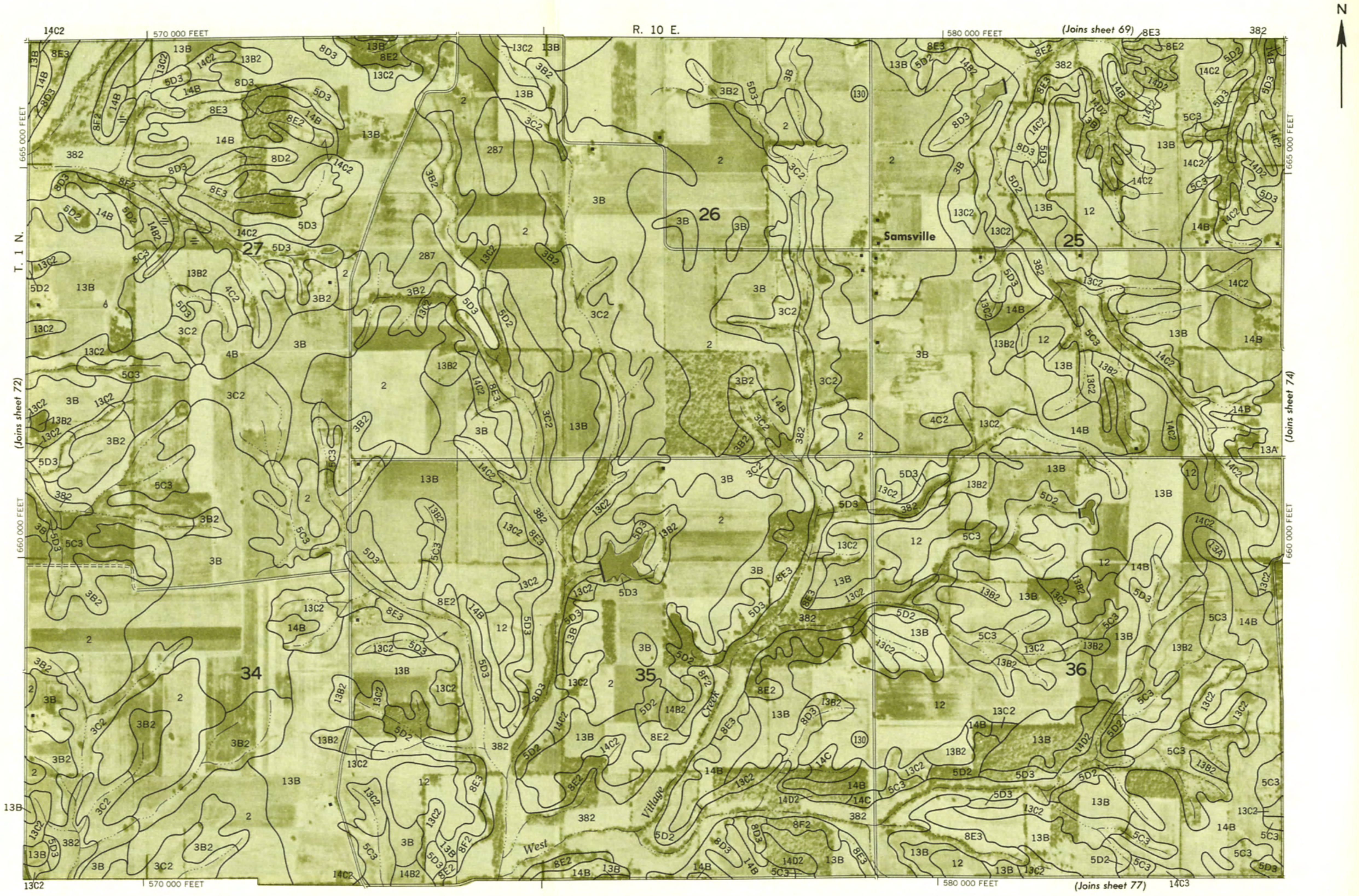

N
R. 10 E.
T. 1 N.
(Joins sheet 65)
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 73)
570 000 FEET
580 000 FEET
675 000 FEET
670 000 FEET
Long Prairie Church
15
14
13
22
23
24


N
585 000 FEET
(Joins sheet 66)
R. 11 E.
R. 14 W.
595 000 FEET
675 000 FEET
670 000 FEET
(Joins sheet 69)
(Joins sheet 71)
T. 1 N.
West Salem
CENTRAL
ILLINOIS
Walser
Creek
water
18
17
19
20
585 000 FEET
(Joins sheet 74)
595 000 FEET

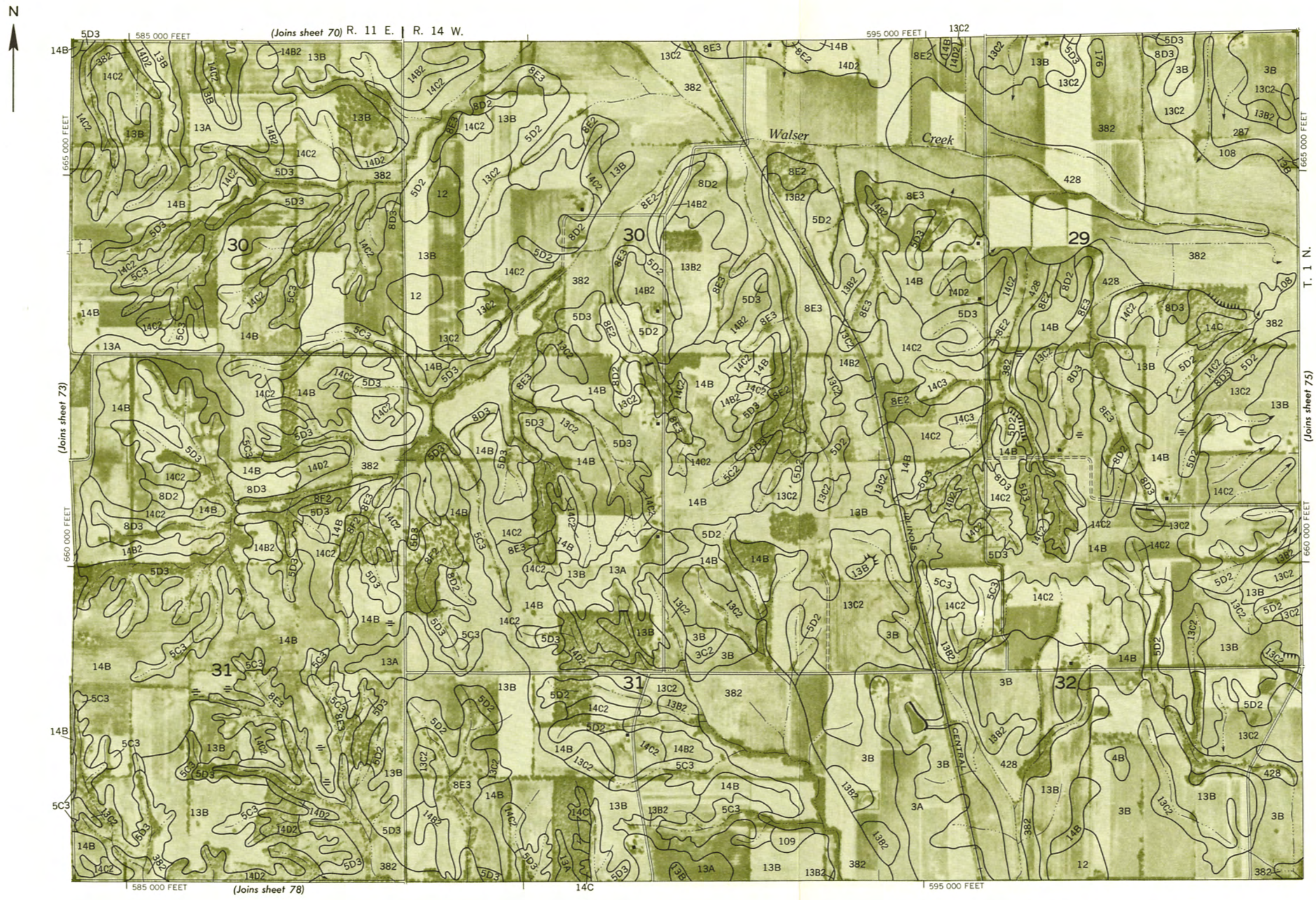

N
(Joins sheet 67)
600 000 FEET
R. 14 W.
615 000 FEET
675 000 FEET
670 000 FEET
T. 1 N.
(Joins sheet 70)
(Joins sheet 75)
Crooked
Creek
CREEK
BONPAS
WABASH
COUNTY
14
15
16
21
22

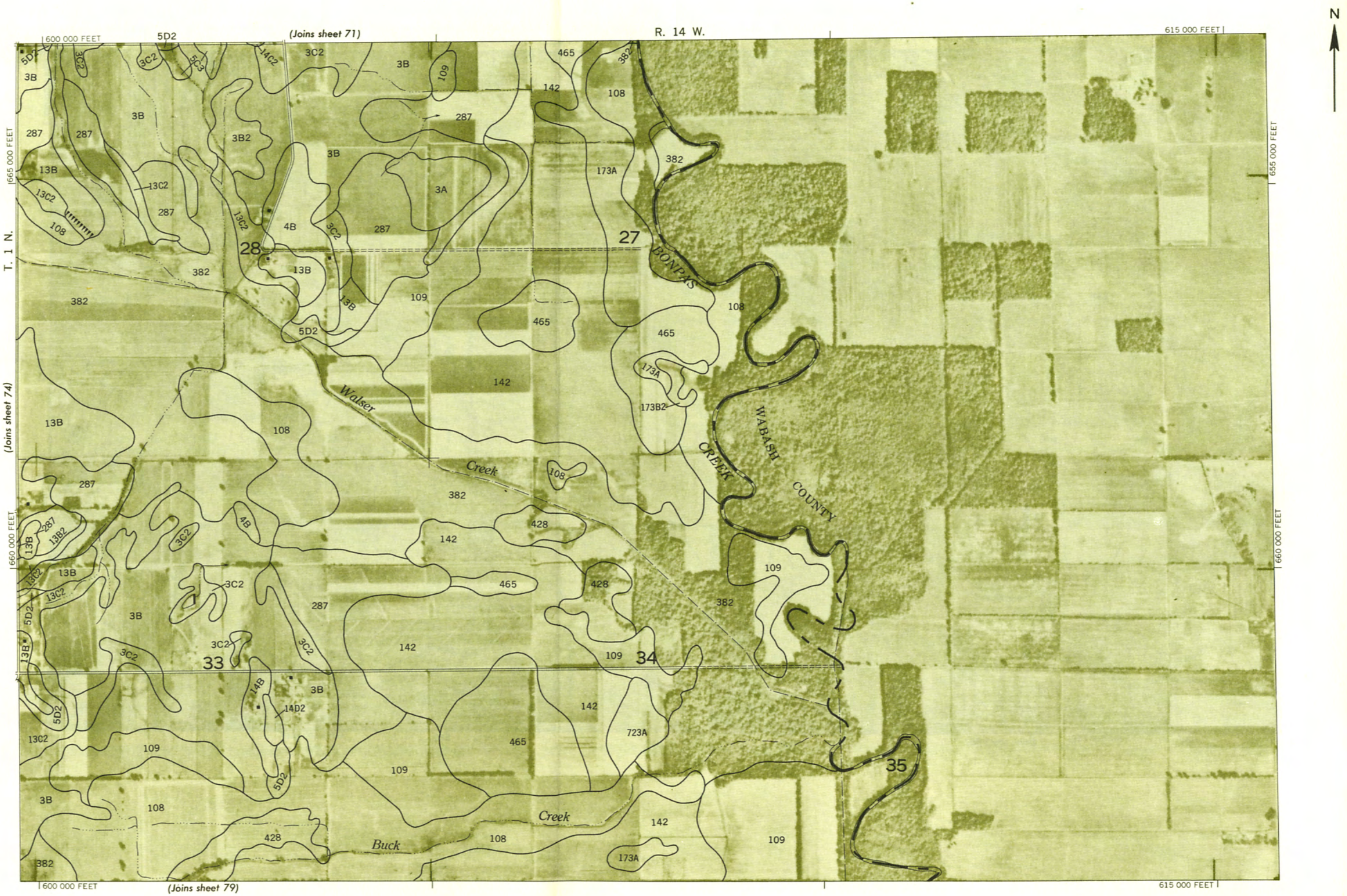
N

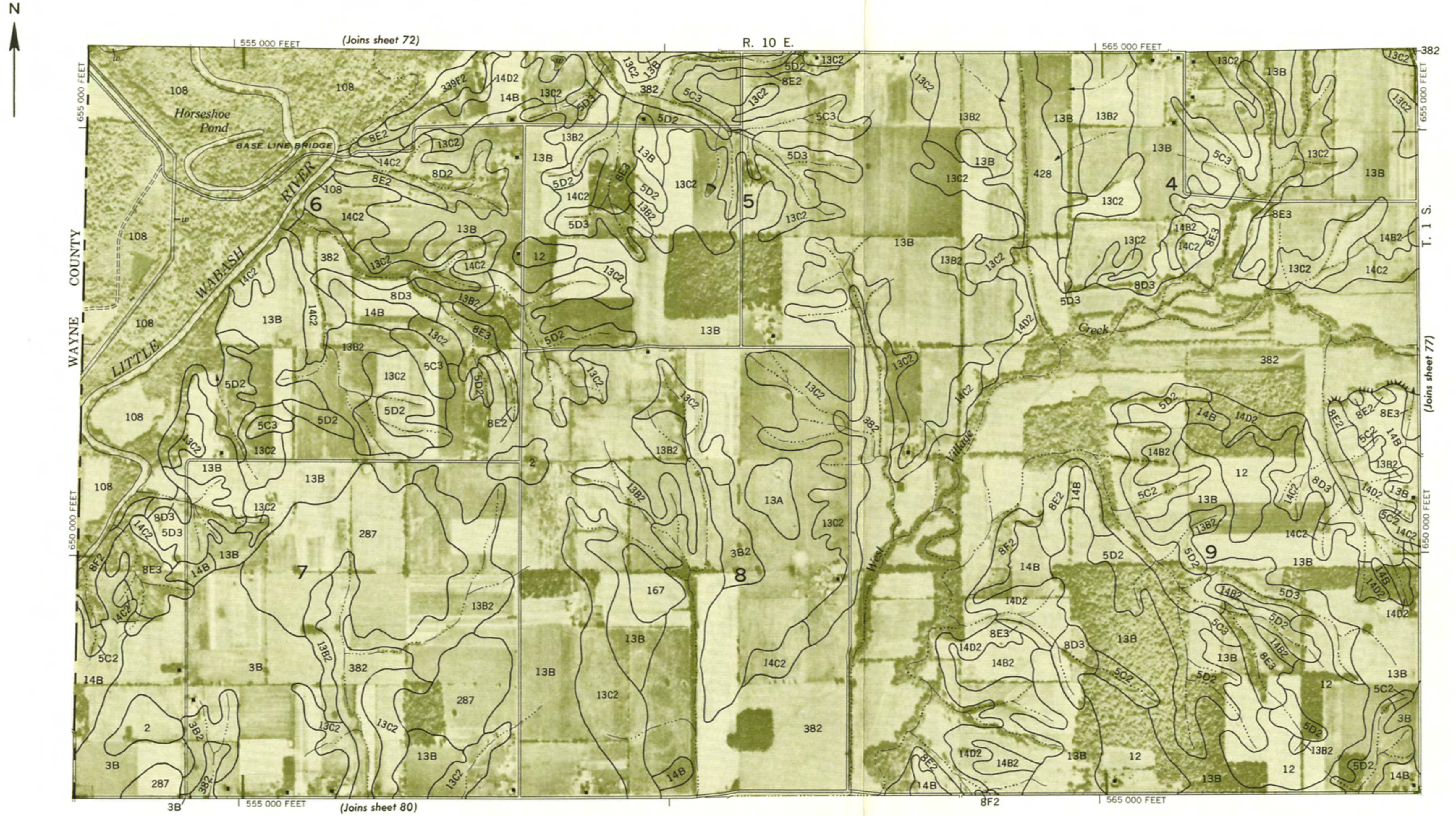

555 000 FEET
(Joins sheet 68)
R. 10 E.
565 000 FEET
665 000 FEET
660 000 FEET
T. 1 N.
(Joins sheet 73)
(Joins sheet 76)
WAYNE COUNTY
LITTLE WABASH RIVER
LITTLE WABASH R
29
28
30
31
32
33
108
382
8D3
13B
8E3
13C2
14B
8D3
5D2
14B2
5D3
8E2
8D2
14C2
14C
13B2
5C3
3B
3B2
3C2
2
12
428
339F2
8F2
14C3
13C2
5C2
14D2
3B
5D2
8E3
14B
13C2


N
R. 10 E.
T. 1 N.
570 000 FEET
580 000 FEET
665 000 FEET
660 000 FEET
(Joins sheet 69)
(Joins sheet 72)
(Joins sheet 74)
(Joins sheet 77)
Samsville
West Village Creek
27
26
25
34
35
36
130

74

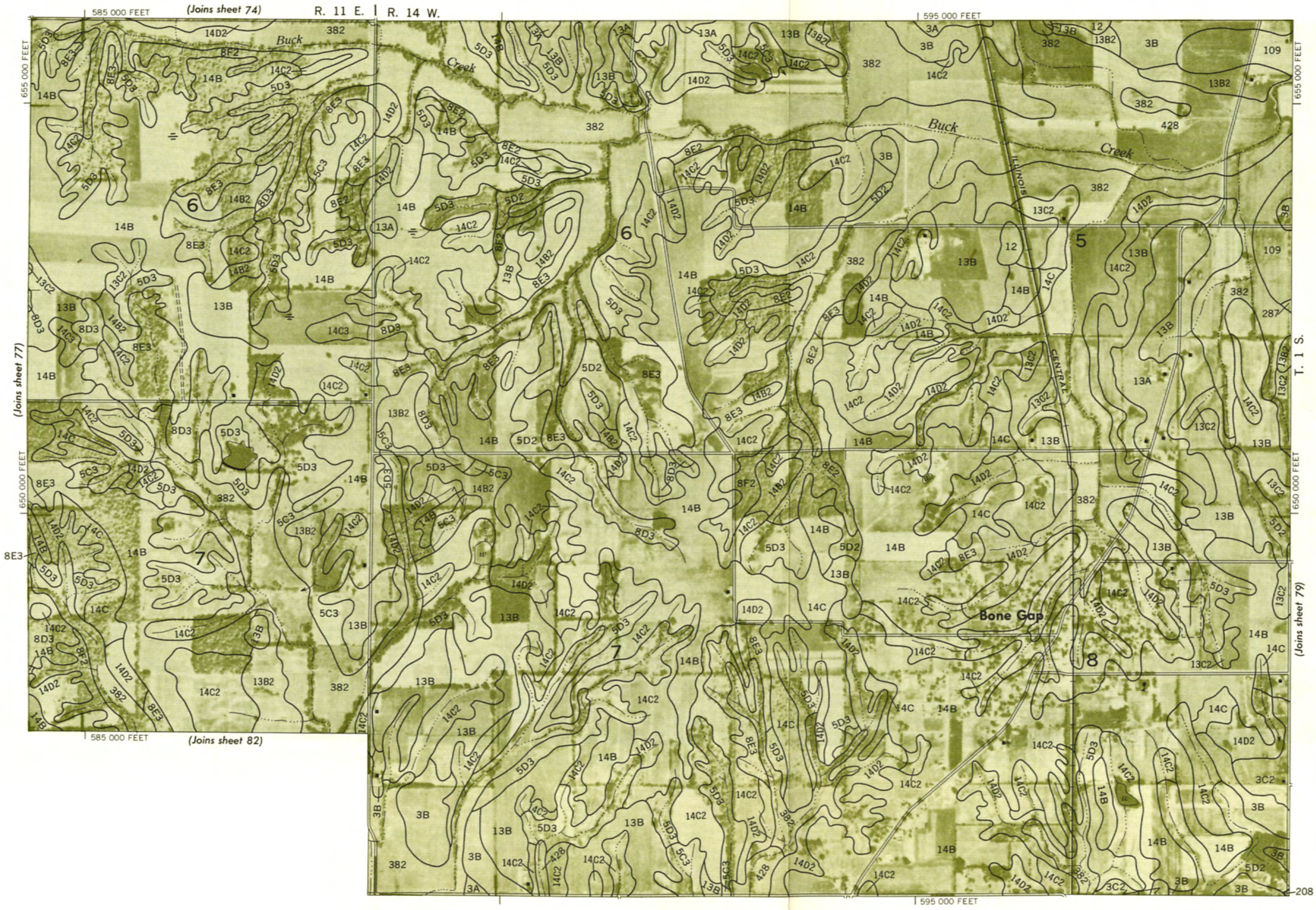

N
(Joins sheet 70)
R. 11 E.
R. 14 W.
585 000 FEET
595 000 FEET
665 000 FEET
660 000 FEET
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 78)
T. 1 N.
Walser
Creek
ILLINOIS
CENTRAL
30
30
29
31
31
32


N
(Joins sheet 71)
R. 14 W.
600 000 FEET
615 000 FEET
665 000 FEET
660 000 FEET
655 000 FEET
650 000 FEET
T. 1 N.
(Joins sheet 74)
(Joins sheet 79)
27
28
33
34
35
Walser Creek
Buck Creek
BONPAS CREEK
WABASH COUNTY


N
555 000 FEET
(Joins sheet 72)
R. 10 E.
565 000 FEET
382
655 000 FEET
Horseshoe Pond
BASE LINE BRIDGE
LITTLE WABASH RIVER
WAYNE COUNTY
T. 1 S.
(Joins sheet 77)
650 000 FEET
Creek
West Village
6
5
4
7
8
9
3B
555 000 FEET
(Joins sheet 80)
8F2
565 000 FEET


N
R. 10 E.
570 000 FEET
580 000 FEET
(Joins sheet 73)
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 81)
655 000 FEET
650 000 FEET
T. 1 S.
West Village Creek
1
2
3
10
11
12

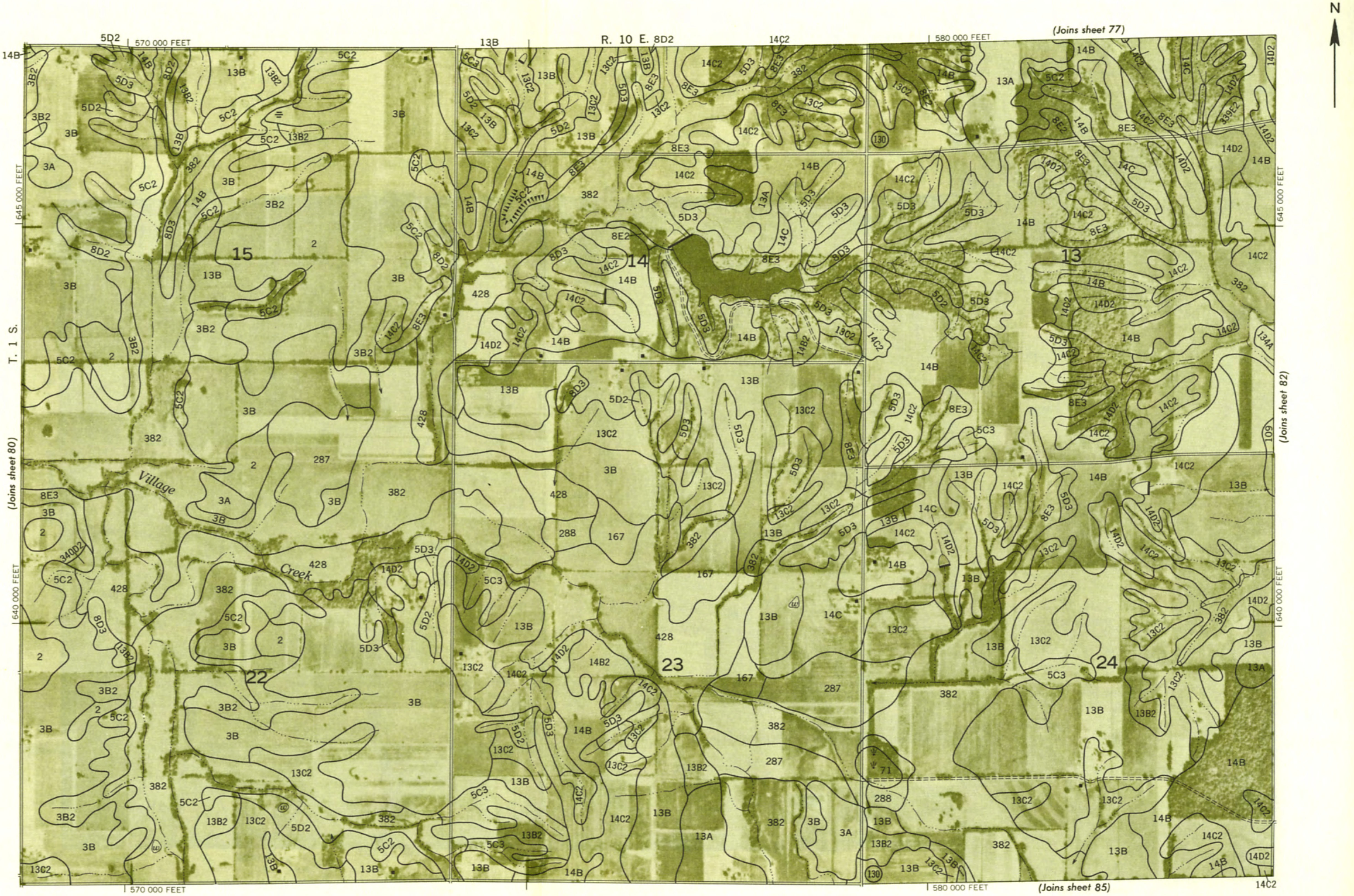
N

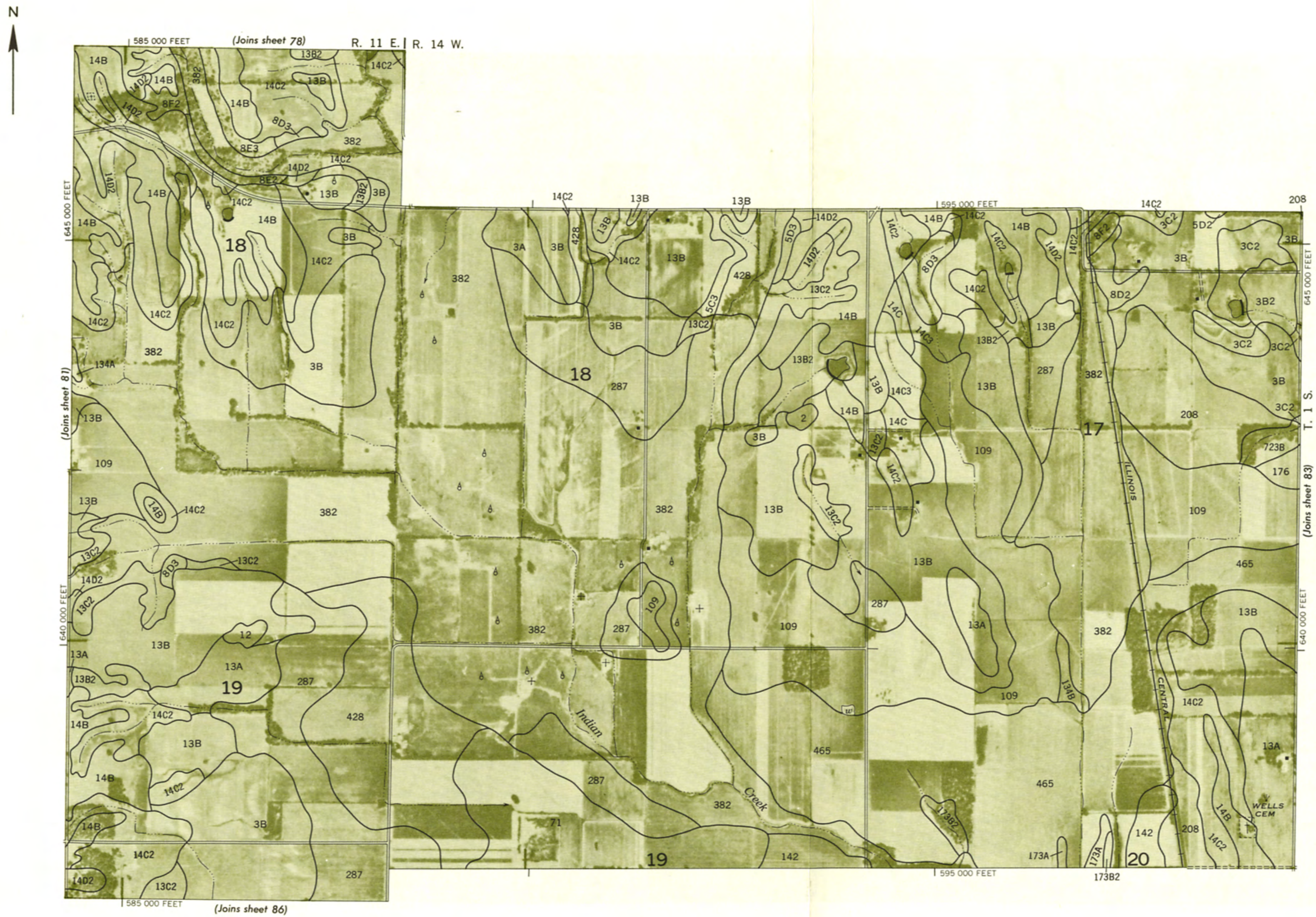

585 000 FEET
(Joins sheet 74)
R. 11 E. | R. 14 W.
595 000 FEET
655 000 FEET
650 000 FEET
(Joins sheet 77)
(Joins sheet 79)
T. 1 S.
585 000 FEET
(Joins sheet 82)
595 000 FEET
Buck Creek
Illinois Central
Bone Gap
5
6
7
8
8E3
208

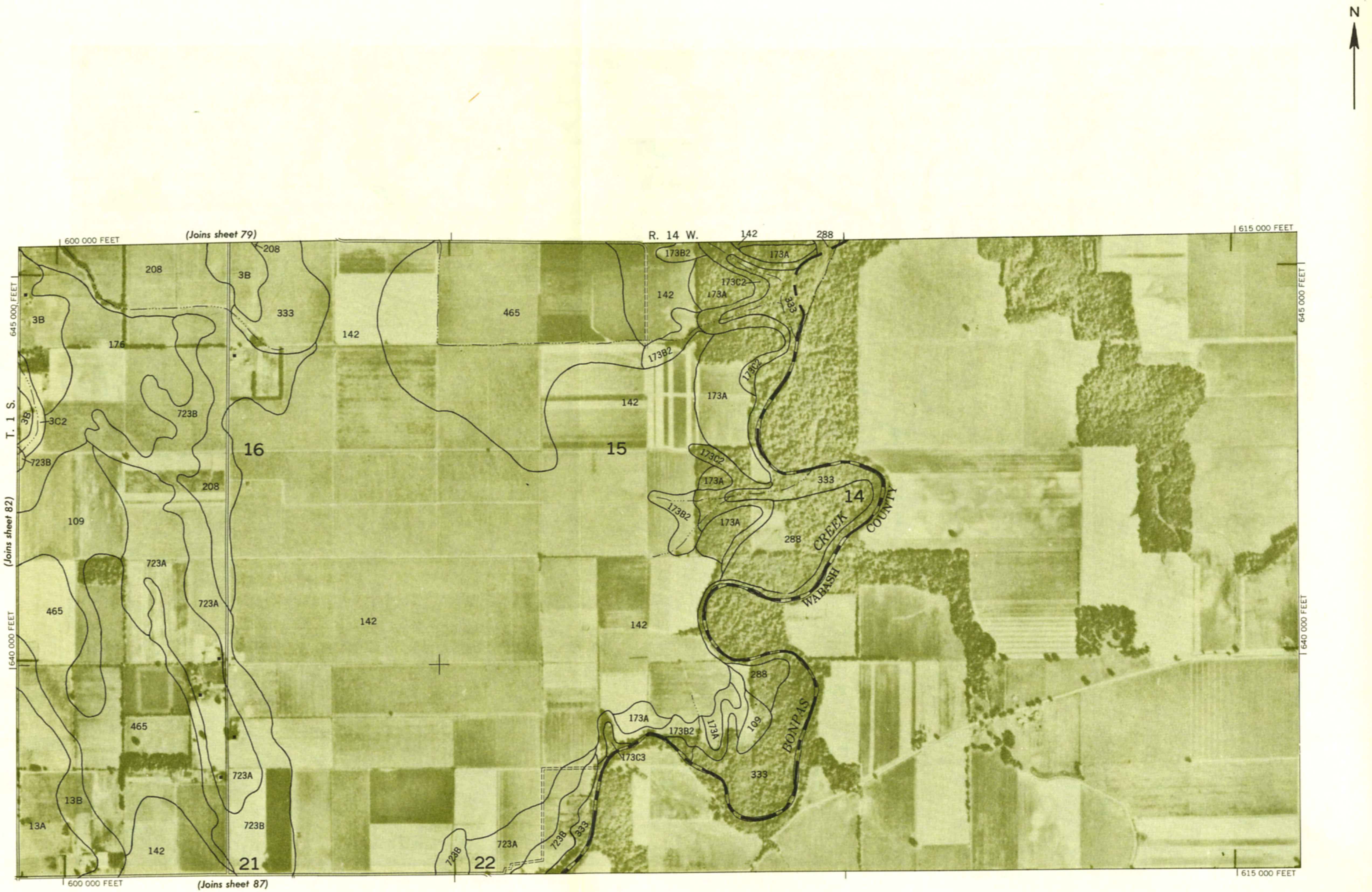

(Joins sheet 75)
R. 14 W.
600 000 FEET
615 000 FEET
655 000 FEET
650 000 FEET
T. 1 S.
(Joins sheet 78)
(Joins sheet 83)
N
Buck
BONPAS
CREEK
WABASH
COUNTY
2
3
4
9
10
11
3B
382
428
108
109
142
465
287
173B2
173A
71
3C2
3A
208
333
288
173C2
13B2
14B2
14C2
14B
13C2
5D3
13B
5D2
14D2
8D2
8E2
14C
8D3
3B2

N

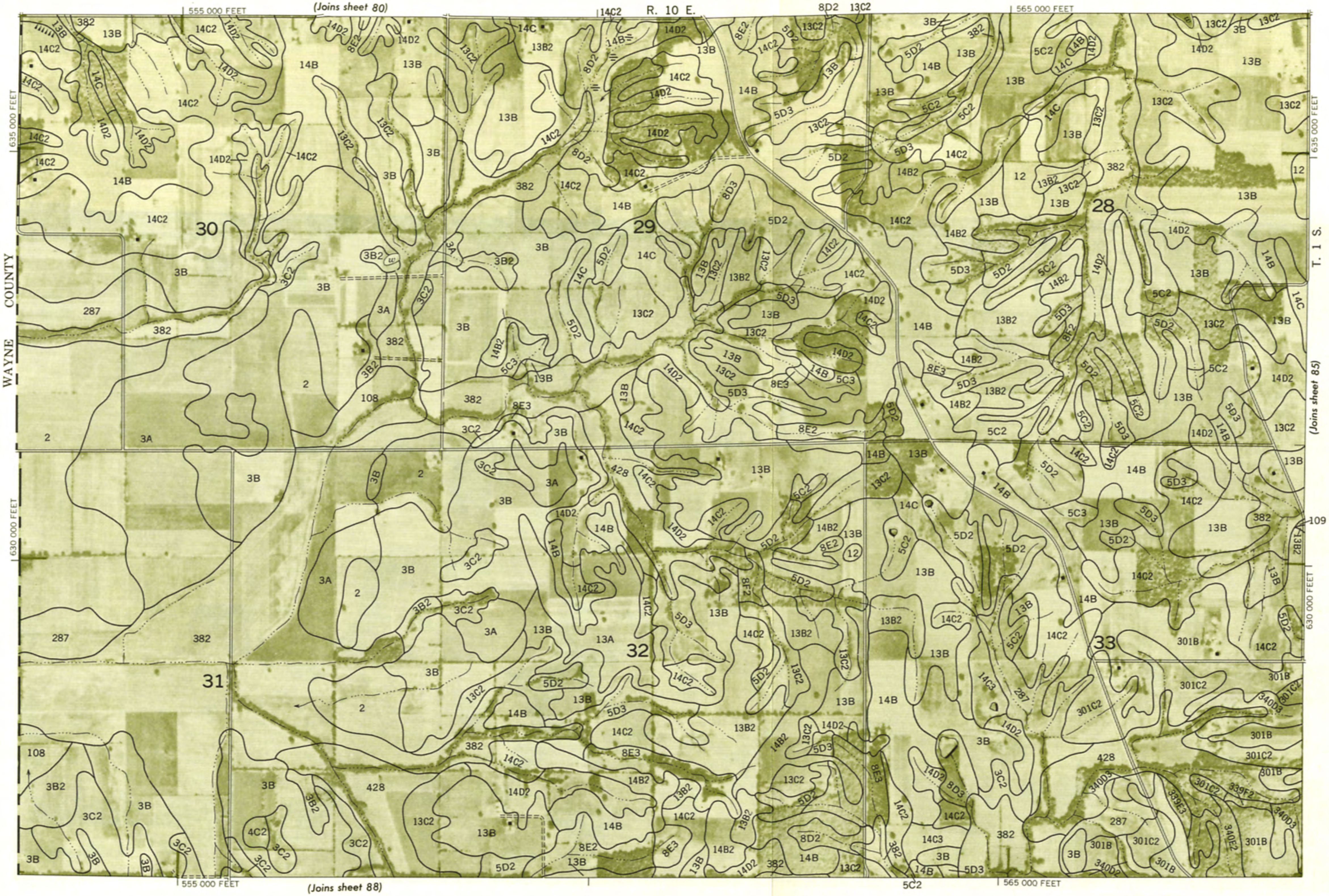

(Joins sheet 76)
555 000 FEET
R. 10 E.
565 000 FEET
645 000 FEET
640 000 FEET
WAYNE COUNTY
T. 1 S.
(Joins sheet 81)
(Joins sheet 84)
West Village Creek
Village Creek
Samaira Church
18
17
16
19
20
21


N
R. 10 E.
T. 1 S.
570 000 FEET
580 000 FEET
645 000 FEET
640 000 FEET
(Joins sheet 77)
(Joins sheet 80)
(Joins sheet 82)
(Joins sheet 85)
Village Creek
15
14
13
22
23
24

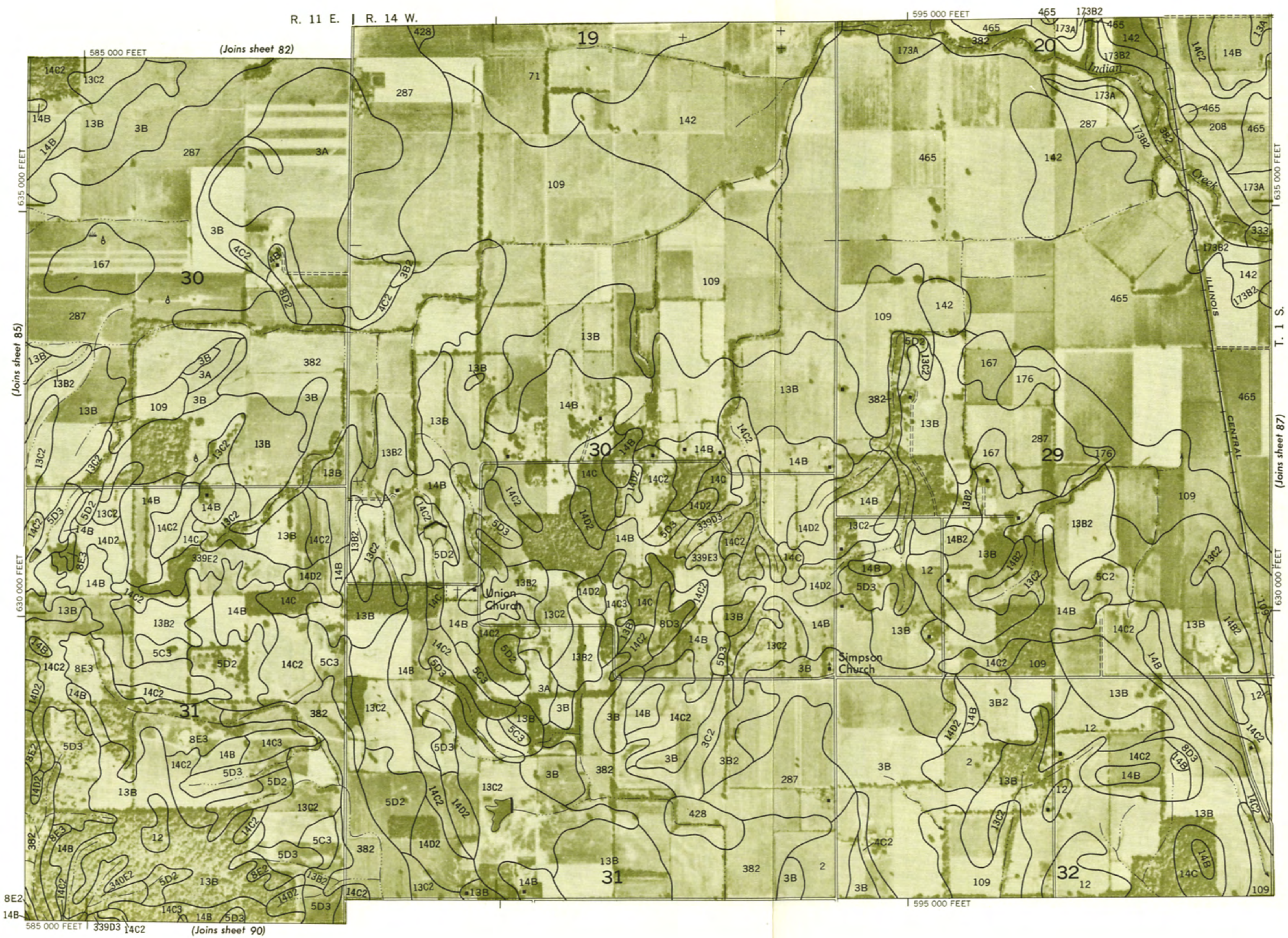

N
585 000 FEET
(Joins sheet 78)
R. 11 E.
R. 14 W.
645 000 FEET
640 000 FEET
595 000 FEET
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 86)
T. 1 S.
18
17
19
20
Indian
Creek
ILLINOIS
CENTRAL
WELLS
CEM


N
(Joins sheet 79)
(Joins sheet 82)
(Joins sheet 87)
600 000 FEET
615 000 FEET
645 000 FEET
640 000 FEET
R. 14 W.
T. 1 S.
16
15
14
21
22
WABASH
COUNTY
BONPAS
CREEK
208
3B
333
142
465
176
723B
3C2
109
723A
13B
13A
173B2
173A
173C2
288
173C3

N


(Joins sheet 80)
555 000 FEET
R. 10 E.
565 000 FEET
635 000 FEET
630 000 FEET
WAYNE COUNTY
T. 1 S.
(Joins sheet 85)
(Joins sheet 88)
28
29
30
31
32
33


N
R. 10 E.
T. 1 S.
570 000 FEET
580 000 FEET
635 000 FEET
630 000 FEET
(Joins sheet 81)
(Joins sheet 84)
(Joins sheet 86)
(Joins sheet 89)
27
26
25
34
35
36


N
R. 11 E.
R. 14 W.
585 000 FEET
(Joins sheet 82)
595 000 FEET
635 000 FEET
630 000 FEET
(Joins sheet 85)
(Joins sheet 87)
(Joins sheet 90)
T. 1 S.
19
20
30
29
31
32
Indian Creek
ILLINOIS CENTRAL
Union Church
Simpson Church


(Joins sheet 83)
R. 14 W.
600 000 FEET
605 000 FEET
635 000 FEET
630 000 FEET
T. 1 S.
(Joins sheet 86)
(Joins sheet 91)
21
22
27
28
33
34
Indian
Creek
BONPAS
CREEK
WABASH
COUNTY

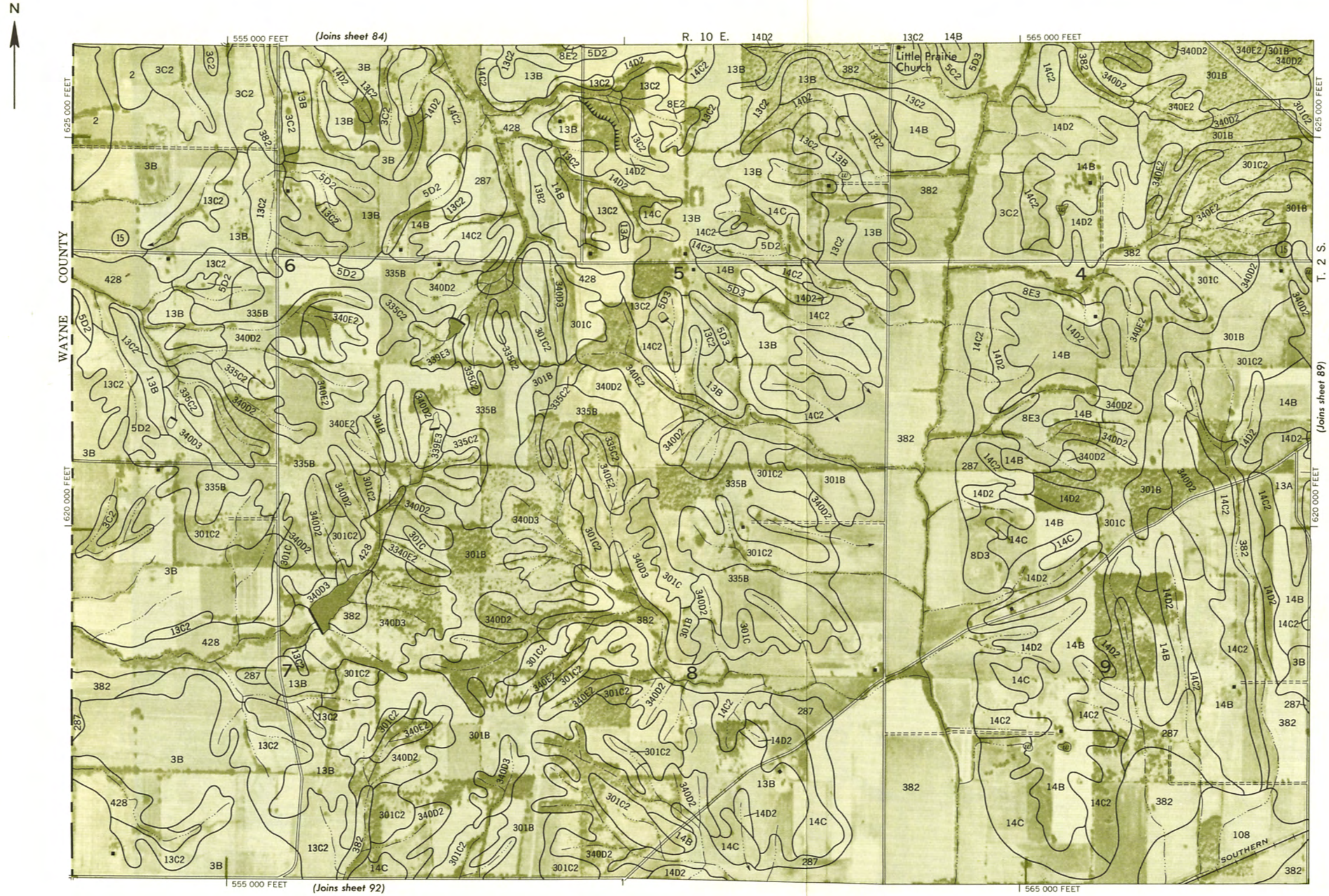

(Joins sheet 54)
R. 14 W.
T. 2 N.
(Joins sheet 59)
(Joins inset, sheet 91)
LAWRENCE COUNTY
Berryville
13
24

N

N

4000 AND 5000-FOOT GRID TICKS

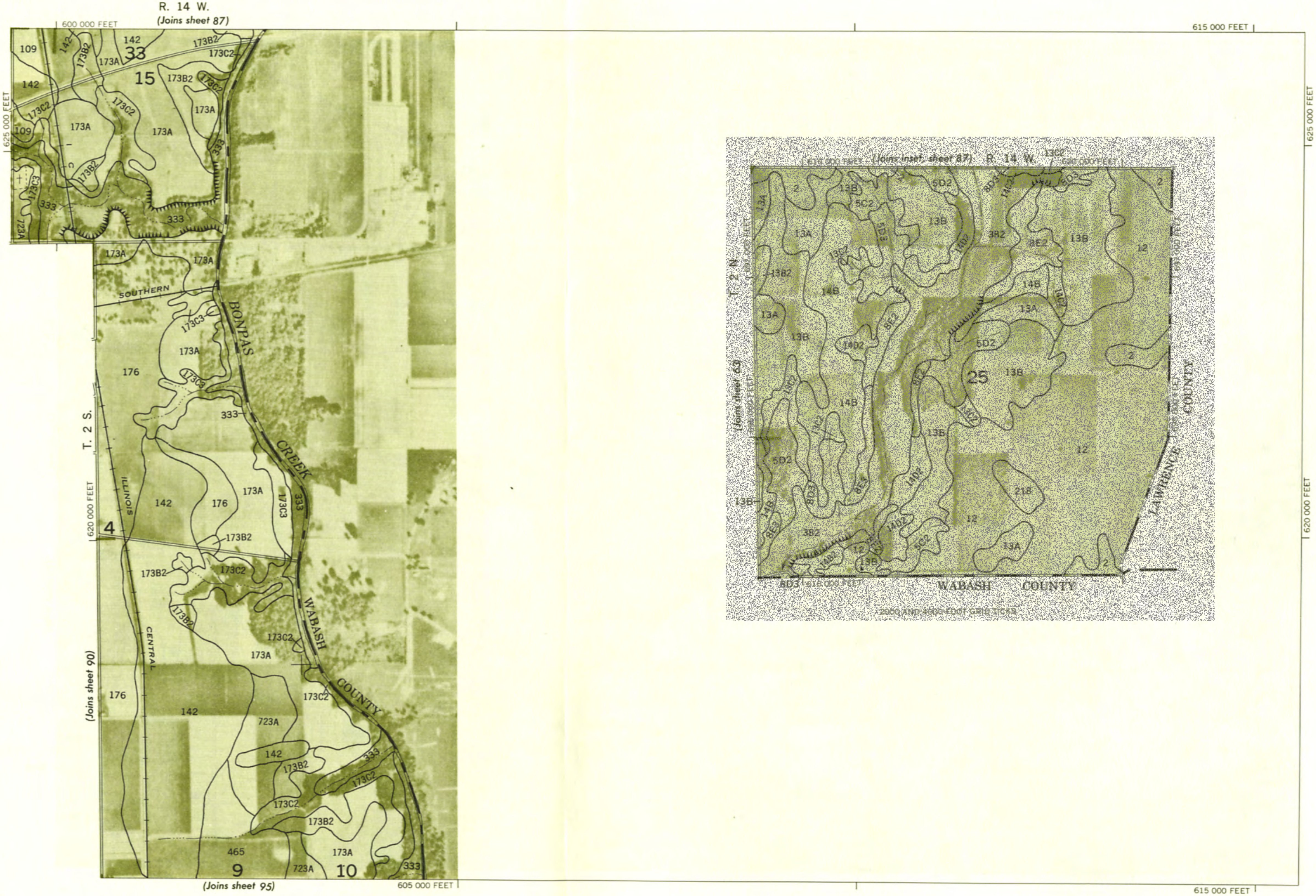
EDWARDS AND RICHLAND COUNTIES, ILLINOIS — SHEET NUMBER 88




N
R. 10 E.
T. 2 S.
570 000 FEET
580 000 FEET
625 000 FEET
620 000 FEET
(Joins sheet 85)
(Joins sheet 88)
(Joins sheet 90)
(Joins sheet 93)
Albion
(county seat)
SOUTHERN
QUARRY
water
Creek
Butler
1
2
3
10
11
12
15
130


N
R. 11 E. | R. 14 W.
(Joins sheet 86)
(Joins sheet 89)
(Joins sheet 91)
(Joins sheet 94)
T. 2 S.
625 000 FEET
620 000 FEET
585 000 FEET
600 000 FEET
Browns
SOUTHERN
31
32
6
5
4
7
8
9
15
130
8E3
339D3
5D3
14B
14D2
14C2
14B2
14C
14C3
3B
13B
13C2
13B2
13A
287
382
109
2
4C2
12
13B
14D2
173A
173B2
173C2
173C3
723A
723B
723C2
333
142
465
108
428
335B
335C2
340D2
340E2
301B
301C
301C2
214B
214C2
164A
164B
176
142
465
287

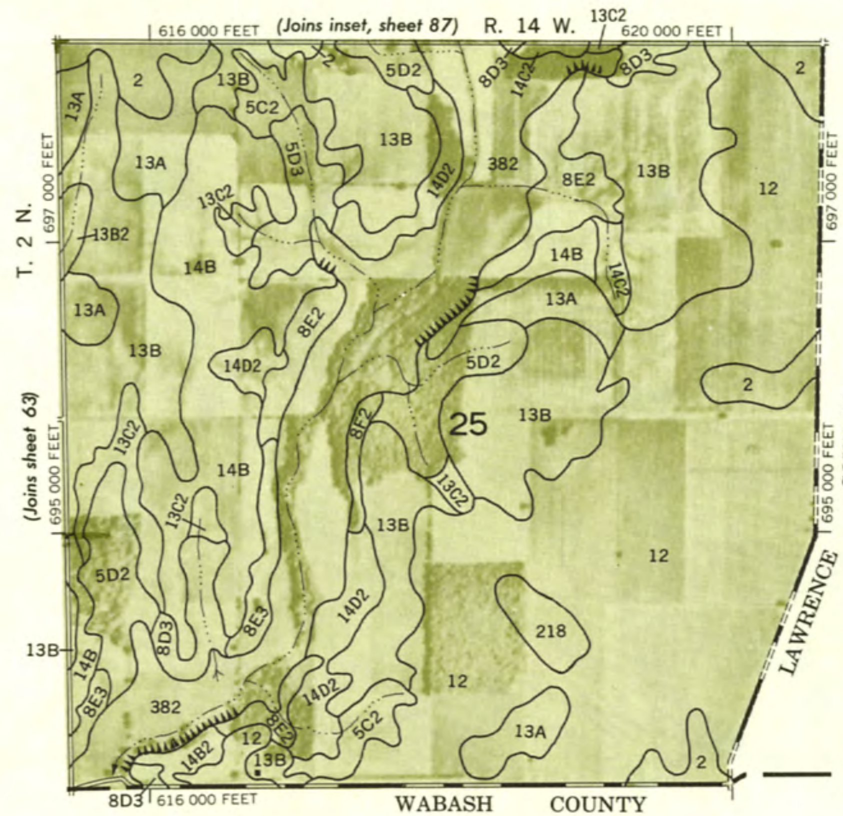
N


R. 14 W.
(Joins sheet 87)
600 000 FEET
615 000 FEET
625 000 FEET
620 000 FEET
605 000 FEET
T. 2 S.
(Joins sheet 90)
(Joins sheet 95)
33
15
4
9
10
25
SOUTHERN
ILLINOIS
CENTRAL
BONPAS
CREEK
WABASH
COUNTY
109
142
173A
173B2
173C2
173C3
176
333
465
723A
(Joins inset, sheet 87)
R. 14 W.
T. 2 N.
(Joins sheet 63)
LAWRENCE
COUNTY
WABASH
COUNTY
2
12
13A
13B
13B2
14B
14D2
218
3B2
5C2
5D2
5D3
8D3
8E2

N

615 000 FEET

625 000 FEET

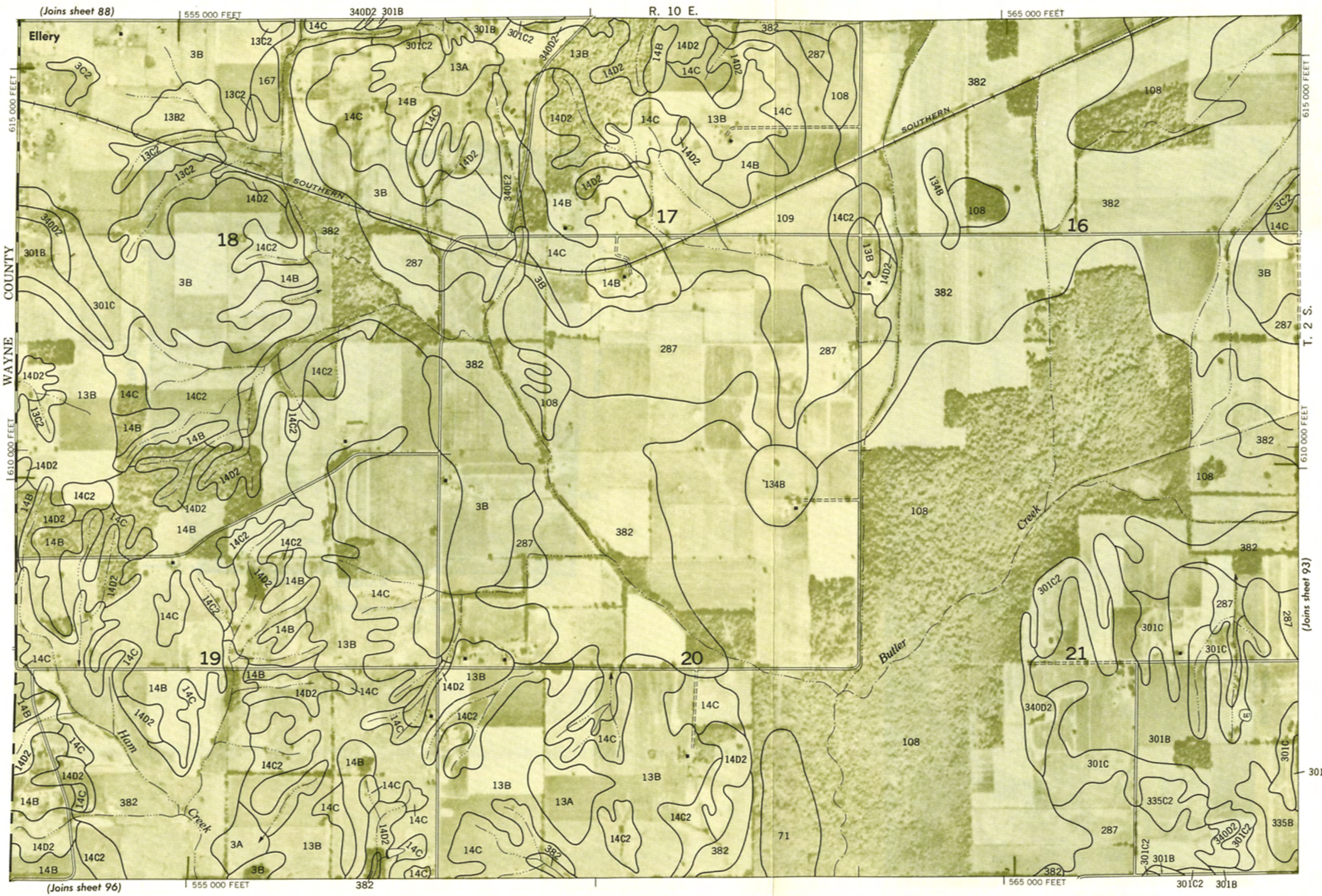


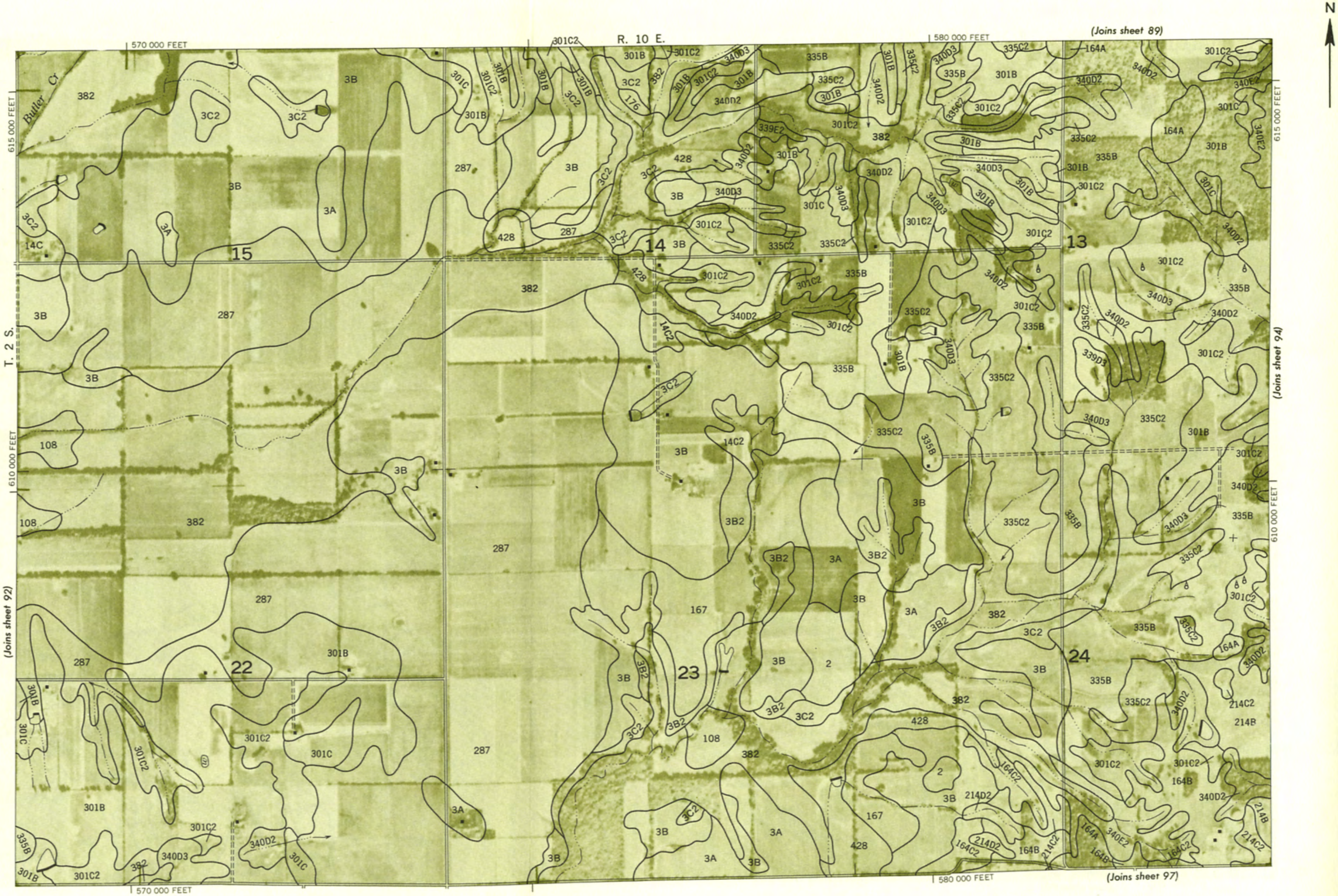
2000 AND 4000-FOOT GRID TICKS

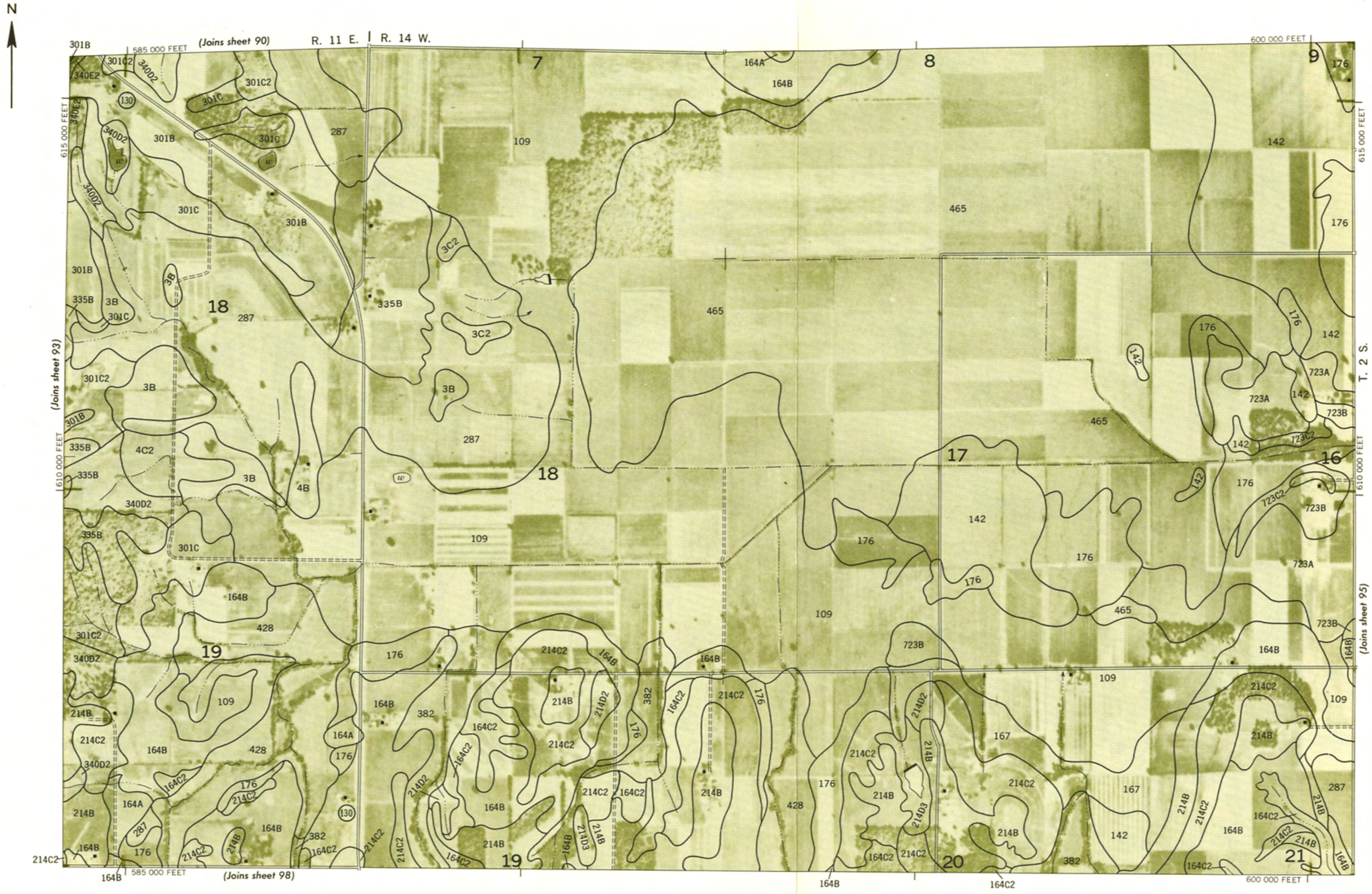
620 000 FEET

615 000 FEET

N


(Joins sheet 88)
555 000 FEET
R. 10 E.
565 000 FEET
Ellery
615 000 FEET
SOUTHERN
WAYNE COUNTY
T. 2 S.
610 000 FEET
17
18
16
19
20
21
Butler
Creek
Ham
Creek
(Joins sheet 93)
(Joins sheet 96)
555 000 FEET
565 000 FEET

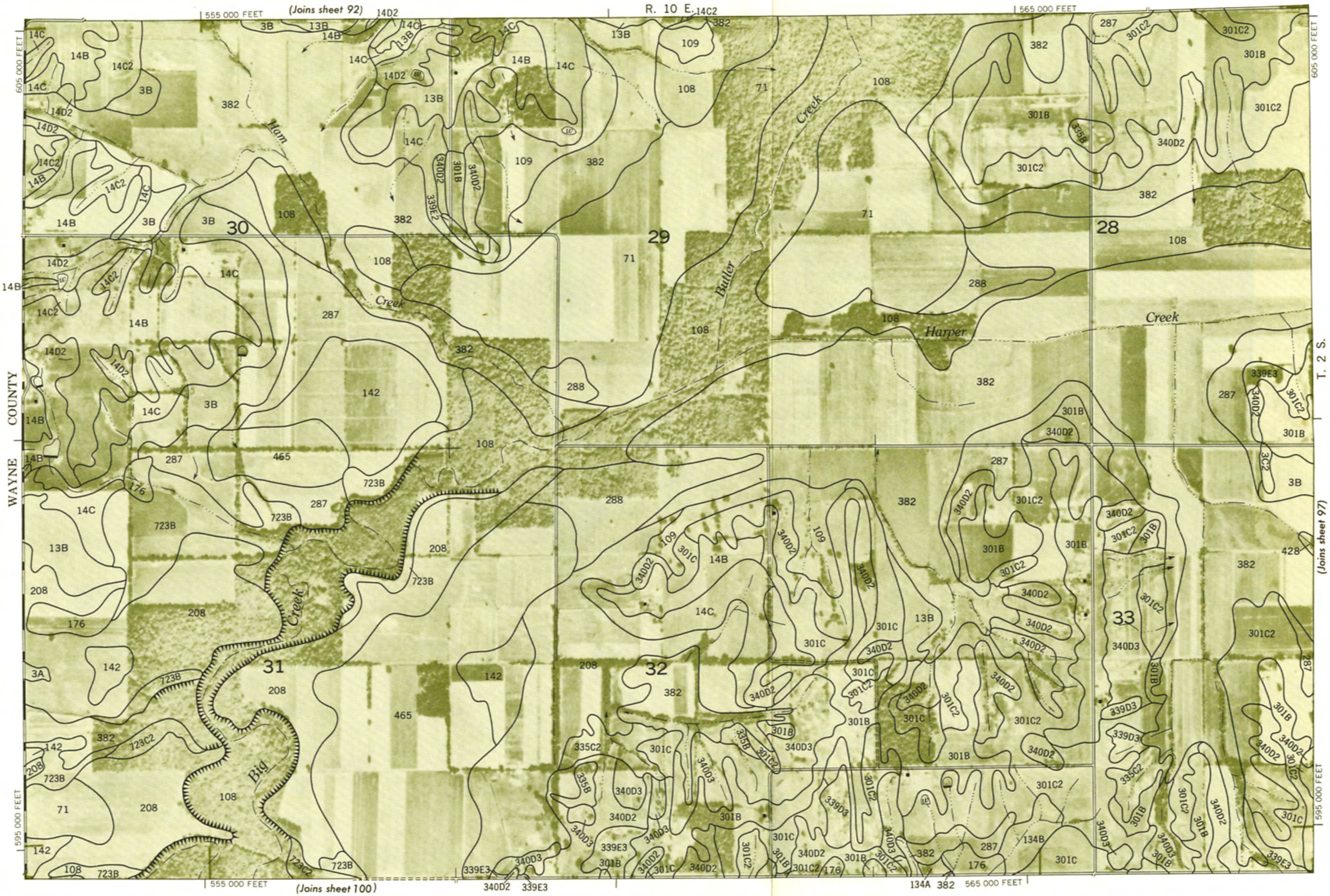

N
R. 10 E.
T. 2 S.
(Joins sheet 89)
(Joins sheet 92)
(Joins sheet 94)
(Joins sheet 97)
570 000 FEET
580 000 FEET
615 000 FEET
610 000 FEET
Butler Cr.
15
14
13
22
23
24


N
(Joins sheet 90)
R. 11 E.
R. 14 W.
585 000 FEET
600 000 FEET
615 000 FEET
610 000 FEET
(Joins sheet 93)
(Joins sheet 95)
(Joins sheet 98)
T. 2 S.
7
8
9
16
17
18
19
20
21
301B
301C2
340E2
340D2
301C
130
287
109
164A
164B
176
142
465
335B
3B
3C2
4C2
4B
723A
723B
723C2
428
214B
214C2
214D2
214D3
382
164C2
167

N


(Joins sheet 91)
R. 14 W.
605 000 FEET
615 000 FEET
615 000 FEET
610 000 FEET
T. 2 S.
(Joins sheet 94)
(Joins sheet 99)
BONPAS CREEK
WABASH COUNTY
CENTRAL
ILLINOIS
9
10
15
16
21
22
176
142
465
723A
173A
173C2
173B2
333
723B
173C3
723C2
214D2
214C2
214E2
214B
164B
164C2
214D3
131B
173B
214C2
173B2
108
208
287

N


(Joins sheet 92)
R. 10 E.
555 000 FEET
565 000 FEET
605 000 FEET
595 000 FEET
T. 2 S.
(Joins sheet 97)
(Joins sheet 100)
WAYNE COUNTY
Ham Creek
Butler Creek
Harper Creek
Big Creek
30
29
28
31
32
33

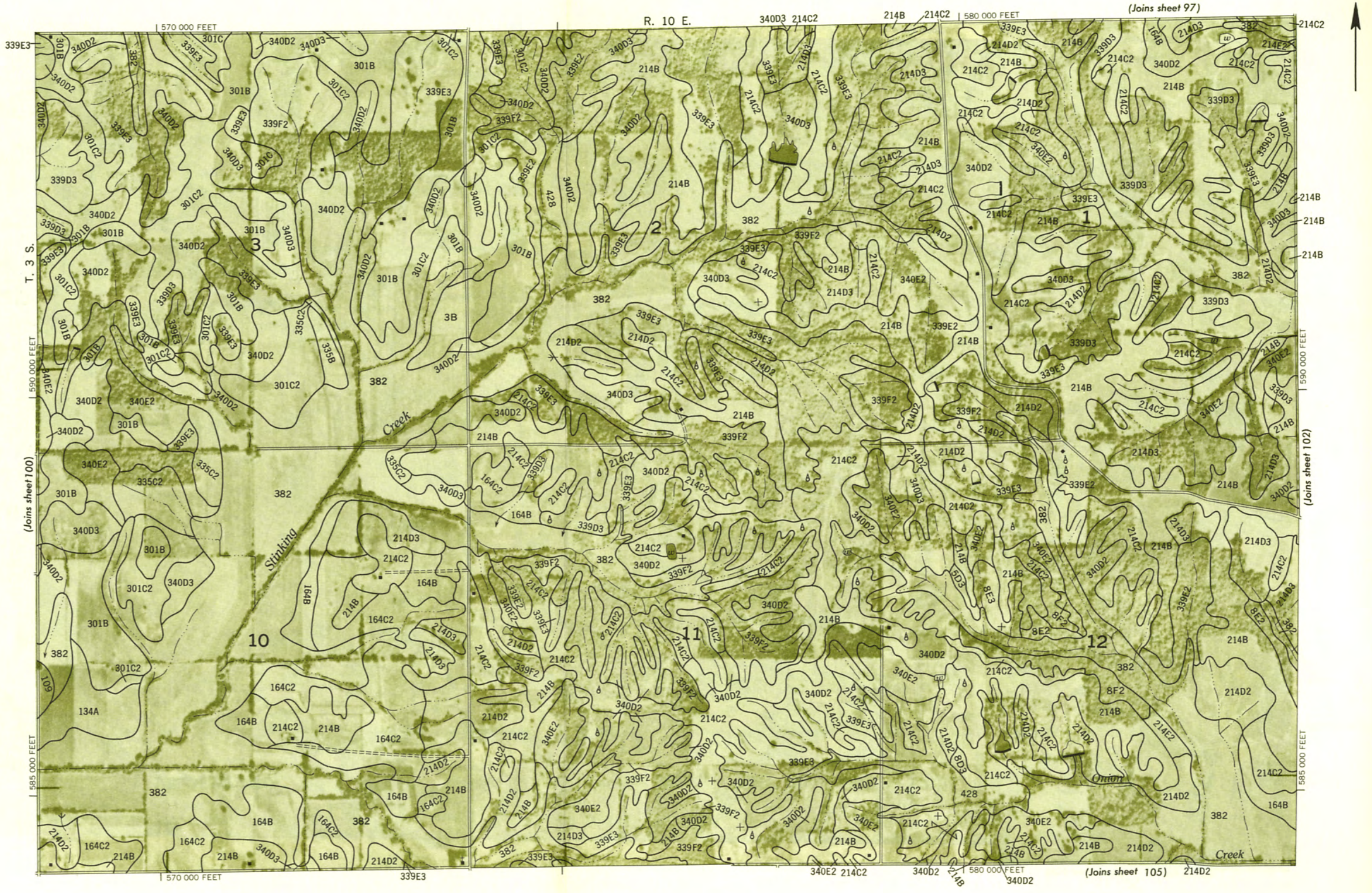
N

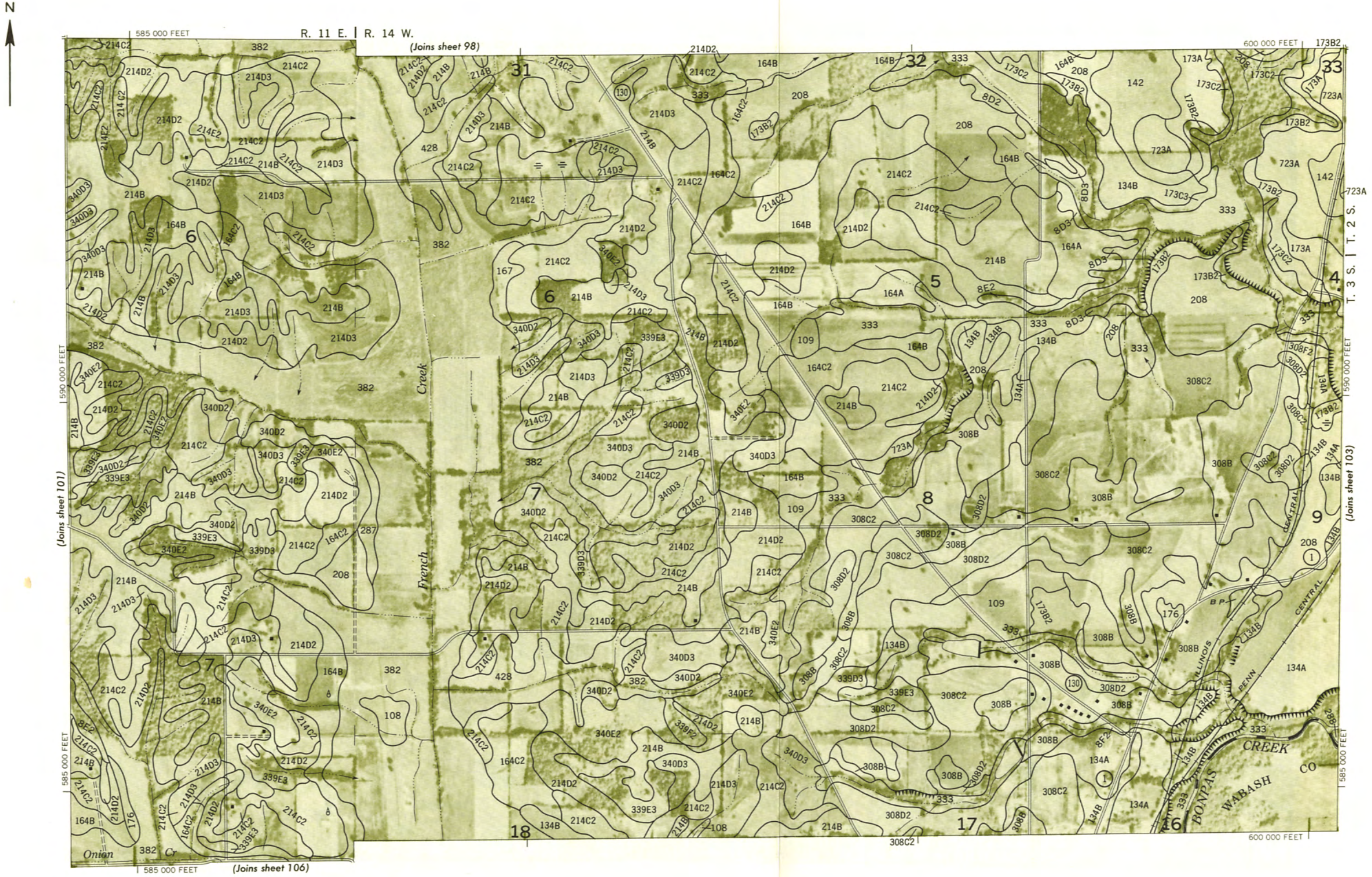

570 000 FEET
R. 10 E.
580 000 FEET
(Joins sheet 93)
605 000 FEET
T. 2 S.
(Joins sheet 96)
(Joins sheet 98)
595 000 FEET
(Joins sheet 101)
Harper
Creek
Mt Zion Church
27
26
25
34
35
36
301C2
340D3
301C
287
3B
3A
428
142
382
3B2
3C2
214C2
164A
164C2
164B
214B
214D2
214D3
8D3
8E3
339E3
340E2
301B
340D2
108
335B
339D3
301C2
214E2


N
(Joins sheet 94)
R. 11 E. | R. 14 W.
585 000 FEET
600 000 FEET
605 000 FEET
595 000 FEET
T. 2 S.
(Joins sheet 97)
(Joins sheet 99)
(Joins sheet 102)
19
20
21
28
29
30
31
32
33
French
Creek
water


(Joins sheet 95)
605 000 FEET
R. 14 W.
615 000 FEET
N
605 000 FEET
595 000 FEET
T. 2 S.
214B
173B2
723A
(Joins sheet 98)
(Joins sheet 103)
21
22
26
27
28
33
34
35
Fortney Church
FORTNEY CEMETERY
CENTRAL
ILLINOIS
BONPAS
CREEK
WABASH
COUNTY
164B
214C2
164C2
214D2
214B
208
723B
723C2
173C3
142
333
214D3
173C2
173A
173B2
723A
723B
308D2
308C2
308B
308F2
164A
339E2
131B
71
109
8F2
335B
176
723C2
308D2
308C2
333

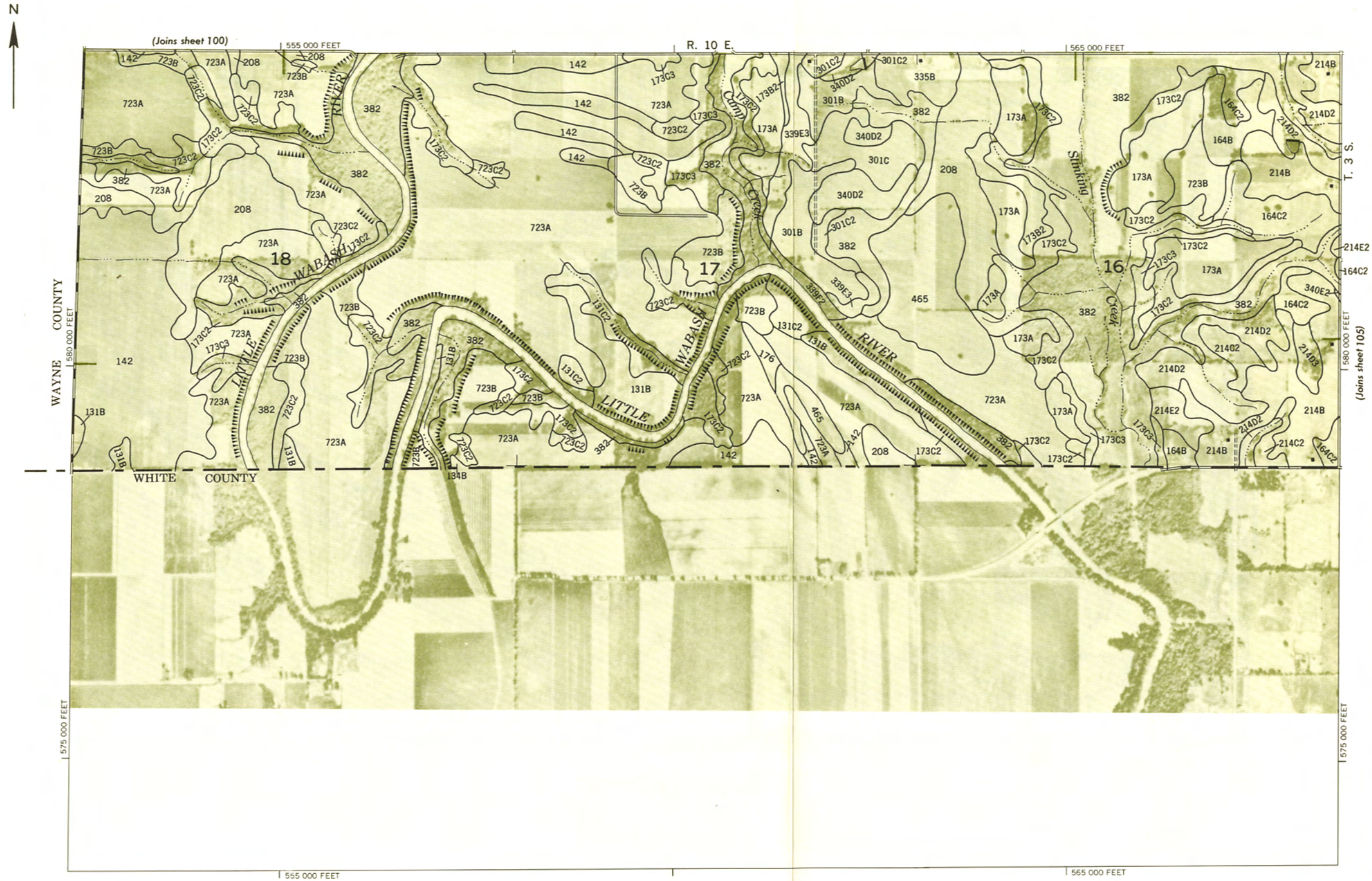

N
(Joins sheet 96)
555 000 FEET
R. 10 E.
565 000 FEET
T. 3 S.
590 000 FEET
585 000 FEET
(Joins sheet 101)
(Joins sheet 104)
WAYNE COUNTY
Big Creek
LITTLE WABASH RIVER
Camp Creek
Stinking Creek
6
5
4
7
8
9

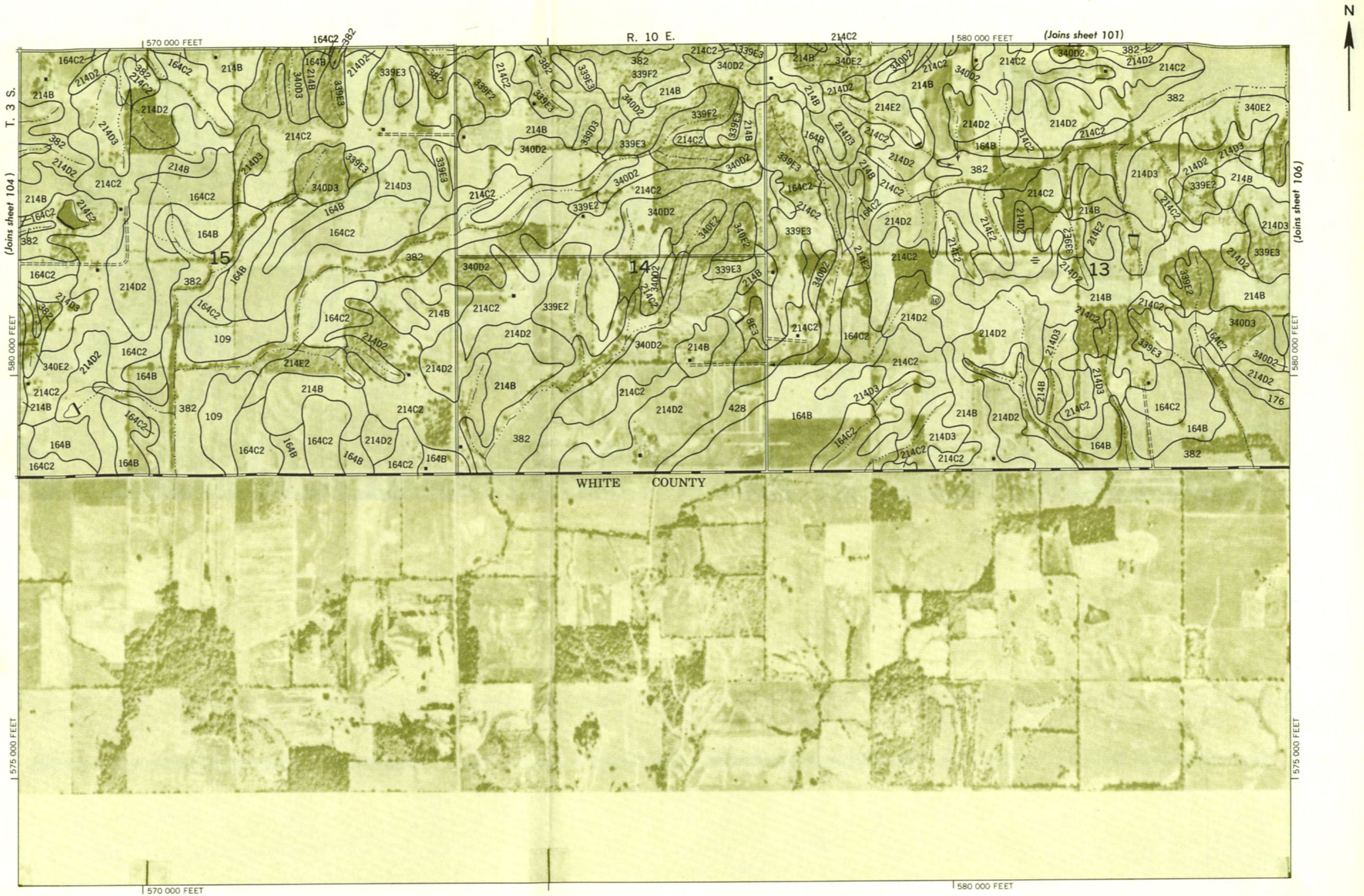

N
R. 10 E.
T. 3 S.
570 000 FEET
580 000 FEET
590 000 FEET
585 000 FEET
(Joins sheet 97)
(Joins sheet 100)
(Joins sheet 102)
(Joins sheet 105)
Stinking Creek
Onion Creek
1
2
3
10
11
12


N
585 000 FEET
R. 11 E. | R. 14 W.
(Joins sheet 98)
600 000 FEET
(Joins sheet 101)
(Joins sheet 103)
(Joins sheet 106)
590 000 FEET
585 000 FEET
T. 2 S. | T. 3 S.
31
32
33
6
5
4
7
8
9
18
17
16
French Creek
Onion Cr
BONPAS CREEK
WABASH CO
ILLINOIS CENTRAL
PENN CENTRAL
B P
308C2

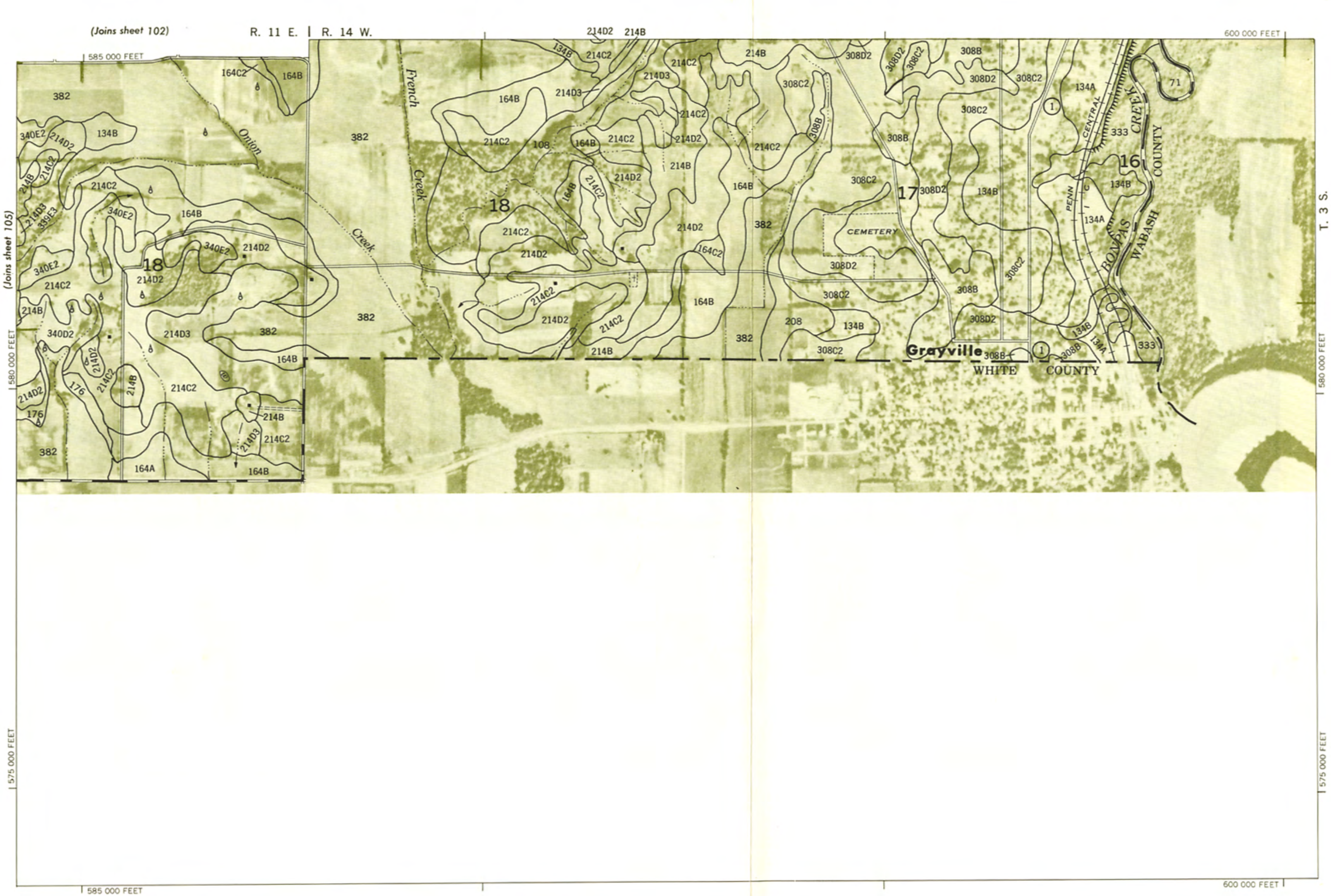

N
(Joins sheet 99)
(Joins sheet 102)
605 000 FEET
615 000 FEET
590 000 FEET
585 000 FEET
R. 14 W.
T. 2 S.
T. 3 S.
33
34
35
2
3
4
9
10
16
CENTRAL
PENN
WABASH COUNTY
BONPAS
CREEK
723C2
723A
142
308C2
308B
308D
308D2
308F2
176
131B
131C2
173A
173B2
173C2
134A
134B
208
287
288
333

EDWARDS AND RICHLAND COUNTIES, ILLINOIS – SHEET NUMBER 104




N
R. 10 E.
T. 3 S.
570 000 FEET
580 000 FEET
(Joins sheet 101)
(Joins sheet 104)
(Joins sheet 106)
575 000 FEET
15
14
13
WHITE COUNTY

106


N
(Joins sheet 102)
R. 11 E.
R. 14 W.
585 000 FEET
600 000 FEET
580 000 FEET
575 000 FEET
(Joins sheet 105)
T. 3 S.
French Creek
Onion Creek
18
17
16
CEMETERY
Grayville
WHITE COUNTY
BONPAS CREEK
WABASH COUNTY
PENN CENTRAL
382
134B
164B
164C2
214B
214C2
214D2
214D3
340E2
339E3
340D2
176
164A
308B
308C2
308D2
134A
333
71
208
108